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A
K E Y
TO THE
INTRODUCTION
TO THE
NATIONAL ARITHMETIC,
EXHIBITING THE OPERATION OF
THE QUESTIONS IN THAT WORK;
FOR THE USE OF TEACHERS ONLY.

BY BENJAMIN GREENLEAF, A. M.,
PRINCIPAL OF BRADFORD TEACHERS' SEMINARY.

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I have examined with some attention Cæsar's Commentaries, edited by Leverett, and Cicero's Orations, edited by Folsom, and am happy to recommend them to classical teachers, as being, in my estimation, far superior to any other editions of those works to which students in this country have general access.

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THE object of the author, in this publication, is to aid the teacher in communicating his instructions to his pupils, and enable him the more readily to detect any error, which they may have made in the operation of their questions.

Every instructor, who has a large number of scholars under his care, is aware of the fact, that it is a great tax on his time, especially when in school, to examine the operation of many questions of his students; whereas, by the aid of a Key, he may be able, in a few moments, to detect any mistake in the operation, and thereby save much of his time, which may be devoted to more useful purposes. Besides, in the hurry of business, it is often very difficult for the most able arithmetician to recollect, at the moment, all the principles by which some difficult questions are performed; but, by recurring to a Key, his difficulty will be obviated.

The author would recommend the following maxim to every teacher:—Never give a pupil a direct answer to any question he may propose respecting the operation of any problem, nor perform the labor for him, but suggest such principles as will enable him to perform the question himself.

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KEY TO THE SUPPLEMENT.

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KEY

TO

GREENLEAF'S INTRODUCTION.

Section 9. (p. 46.)

COMPOUND ADDITION.

4. 191lb. 1oz. 19dwt. 15gr.
 6. 234lb. 13. 23. 19. 12gr.
 8. 102T. 1cwt. 3qr. 9lb. 15oz. 10dr.
 9. 205deg. $7\frac{1}{2}$ m. 5fur. 17rd. $14\frac{1}{2}$ ft. 8in.
 $\frac{1}{2}$ m. = 4fur. $\frac{1}{2}$ ft. = 6in.
 205deg. 8m. 1fur. 17rd. 15ft. 2in.
 10. 74m. 3fur. 39rd. $2\frac{1}{2}$ yd. 2ft. 6in.
 $\frac{1}{2}$ yd. = 1ft. 6in.
 74m. 3fur. 39rd. 3yd. 1ft. 0in.
 11. 278A. 3R. 15p. $131\frac{1}{4}$ ft. 66in.
 $\frac{1}{4}$ ft. = 36in.
 278A. 3R. 15p. 131ft. 102in.
 12. 162A. 0R. 2p. $17\frac{1}{4}$ yd. 4ft. 83in.
 $\frac{1}{4}$ yd. = 2ft. 36in.
 162A. 0R. 2p. 17yd. 6ft. 119in.
 14. 189 E. E. 0qr. 1na. $1\frac{1}{4}$ in.
 16. 213 cords 110ft. 1455in.
 18. 193tun. 2hhd. 27gal. 2qt. 0pt.
 20. 211tun. 0hhd. 53gal. 1qt. 1pt.
 22. 211ch. 19bu. 3pk. 1qt. 1pt.
 24. 250w. 4da. 3h. 39m. 19s.
 26. 11S. 0°. 30'. 21".

NOTE. In performing questions in Motion, we reject the 12's in the sum of the signs, because 12 signs make a circle of the zodiac.

28. 179m. 0fur. 6ch. 3p. 1sl.

Section 10. (p. 51.)

COMPOUND SUBTRACTION.

4. 691lb. 9oz. 4dwt. 22gr.
 6. 63lb. 11 $\frac{1}{2}$ l. 13. 19. 19gr.
 8. 1T. 2cwt. 0qr. 27lb. 3oz. 14dr.
 10. 151 E. E. 4qr. 1na. 1 $\frac{1}{2}$ in
 11. 77deg. 55 $\frac{1}{2}$ m. 5fur. 31rd. 4 $\frac{1}{2}$ yd. 1ft. 8in.
 $\frac{1}{2}$ m. = 4fur. $\frac{1}{2}$ yd = 1ft. 6in.
 77deg. 56m. 1fur. 31rd. 5yd. 0ft. 2in.
 12. 8deg. 59 $\frac{1}{2}$ m. 1fur. 39rd. 2 $\frac{1}{2}$ ft. 10in.
 $\frac{1}{2}$ m. = 4fur. $\frac{1}{2}$ ft. = 6in.
 8deg. 59m. 5fur. 39rd. 3ft. 2in.

NOTE. The pupil will perceive, that the half miles are carried back to the furlongs, and the half feet are also carried back to the inches.

13. 28A. 1R. 35p. 171 $\frac{1}{4}$ ft. 140in.
 $\frac{1}{4}$ ft. = 36in.
 28A. 1R. 35p. 172ft. 32in.
 14. 41A. 1R. 38p. 18 $\frac{1}{2}$ yd. 8ft. 143in.
 $\frac{1}{2}$ yd. = 2ft. 36in.
 41A. 1R. 38p. 19yd. 2ft. 35in.

NOTE. In the above questions it will be perceived, that the quarter of a foot is carried to the inches, and the quarter of a yard to the feet and inches.

16. 371 cords 126ft. 1683in.
 18. 6ltun. 1hhd. 1qt. 1pt. 2gi.
 20. 59tun. 2hhd. 42gal. 2pt. 1qt.
 22. 53ch. 31bu. 5pk. 5qt. 0pt.
 24. 4w. 1da. 9h. 26m. 27s.
 26. 4S. 7°. 58'. 52".

NOTE. In this question, 12 signs are to be added to the minuend before the operation. It may appear an absurdity to some persons, that the minuend is less than the subtrahend, but the student, who is acquainted with astronomy, well knows, that such questions often occur.

28. 13m. 5fur. 3ch. 1p. 211.

Section 11. (p. 53.)

EXERCISES IN COMPOUND ADDITION
AND SUBTRACTION.

1.

| lb. | oz. | dwt. | gr. |
|-----|-----|------|-----|
| 4 | 8 | 13 | 8 |
| 5 | 11 | 19 | 23 |
| 8 | 0 | 17 | 15 |
| 18 | 9 | 14 | 10 |
| 37 | 7 | 5 | 8 |

2.

| lb. | z. | 3. | 9. | gr. |
|-----|----|----|----|-----|
| 7 | 3 | 2 | 2 | 1 |
| 2 | 10 | 0 | 1 | 13 |
| 2 | 3 | 7 | 2 | 17 |
| 12 | 5 | 3 | 0 | 11 |

3.

| T. | cwt. | qr. | lb. | oz. |
|-----|------|-----|-----|-----|
| 17 | 11 | 3 | 11 | 12 |
| 11 | 17 | 1 | 19 | 11 |
| 53 | 19 | 1 | 17 | 8 |
| 27 | 19 | 3 | 18 | 9 |
| 16 | 3 | 3 | 0 | 13 |
| 127 | 12 | 1 | 12 | 5 |

4.

| yd. | qr. | na. |
|-----|-----|-----|
| 37 | 3 | 3 |
| 18 | 1 | 3 |
| 31 | 1 | 2 |
| 87 | 3 | 0 |

5.

| T. | cwt. | qr. | lb. |
|----|------|-----|-----|
| 2 | 13 | 1 | 17 |
| 3 | 0 | 0 | 27 |
| 1 | 0 | 3 | 11 |
| 6 | 14 | 1 | 27 |

6.

| m. | fur. | rd. | ft. | in. |
|-----|------|-----|-----|-----|
| 16 | 7 | 18 | 14 | 11 |
| 19 | 1 | 13 | 16 | 9 |
| 97 | 3 | 27 | 13 | 3 |
| 47 | 5 | 37 | 13 | 10 |
| 181 | 2 | 18 | 8½ | 9 |
| | | | ½ | 6 |

7.

| A. | R. | p. | ft. |
|-----|----|----|-----|
| 169 | 3 | 15 | 227 |
| 187 | 1 | 15 | 165 |
| 217 | 2 | 28 | 165 |
| 574 | 3 | 20 | 12½ |

NOTE. As 8½ feet and 9 inches are equal to 8 feet and 15 inches, so we find 8 feet 15 inches equal to 9 feet 3 inches.

8.

| cord. | ft. | in. |
|-------|-----|------|
| 18 | 116 | 1000 |
| 17 | 111 | 1600 |
| 21 | 109 | 1716 |
| 58 | 82 | 860 |

9.

| gal. | qt. | pt. |
|------|-----|-----|
| 167 | 3 | 1 |
| 186 | 1 | 1 |
| 108 | 2 | 1 |
| 123 | 3 | 0 |
| 586 | 2 | 1 |

10.

| bu. | pk. | qt. | pt. |
|-------|-----|-----|-----|
| 17 | 1 | 7 | 1 |
| 18 | 3 | 2 | 0 |
| 19 | 1 | 3 | 1 |
| 51 | 3 | 0 | 1 |
| <hr/> | | | |
| 107 | 1 | 5 | 1 |

11.

| y. | mo. | da. |
|-------|-----|-----|
| 13 | 4 | 13 |
| 12 | 11 | 23 |
| 18 | 9 | 29 |
| <hr/> | | |
| 45 | 2 | 5 |

12.

| y. | da. | h. | m. | sec. |
|-------|-----|----|----|------|
| 18 | 345 | 13 | 37 | 15 |
| 87 | 169 | 12 | 16 | 28 |
| 316 | 144 | 20 | 53 | 18 |
| 13 | 360 | 21 | 57 | 15 |
| <hr/> | | | | |
| 436 | 290 | 20 | 44 | 16 |

13.

| S. | ° | ' | " |
|-------|----|----|----|
| 3 | 18 | 45 | 15 |
| 7 | 15 | 36 | 18 |
| 5 | 21 | 38 | 27 |
| <hr/> | | | |
| 4 | 26 | 0 | 0 |

NOTE. As this question is in Motion, it is necessary to reject the 12's in the sum of the signs.

14.

| £. | s. | d. |
|-------|----|----|
| 7671 | 0 | 0 |
| 1728 | 17 | 9 |
| <hr/> | | |
| 5942 | 2 | 3 |

15.

| lb. | oz. | dwt. | gr. |
|-------|-----|------|-----|
| 73 | 0 | 0 | 0 |
| 26 | 11 | 13 | 14 |
| <hr/> | | | |
| 46 | 0 | 6 | 10 |

16.

| lb. | §. | 3. | ¢. | gr. |
|-------|----|----|----|-----|
| 71 | 8 | 1 | 1 | 14 |
| 7 | 9 | 1 | 1 | 17 |
| <hr/> | | | | |
| 63 | 10 | 7 | 2 | 17 |

17.

| T. | cwt. | qr. | lb. | oz. |
|-------|------|-----|-----|-----|
| 28 | 13 | 0 | 0 | 0 |
| 10 | 17 | 0 | 19 | 14 |
| <hr/> | | | | |
| 17 | 15 | 3 | 8 | 2 |

18.

| yd. | qr. | na. |
|-------|-----|-----|
| 76 | 0 | 0 |
| 18 | 3 | 2 |
| <hr/> | | |
| 57 | 0 | 2 |

19.

| m. | fur. | rd. | ft. | in. |
|-------|------|-----|-----|-----|
| 20 | 0 | 0 | 0 | 0 |
| 3 | 4 | 18 | 13 | 8 |
| <hr/> | | | | |
| 16 | 3 | 21 | 2½ | 4 |
| | | | | ½=6 |
| <hr/> | | | | |
| 16 | 3 | 21 | 2 | 10 |

NOTE. The half foot, which is 6 inches, is added to the 4 inches, and their sum is 10 inches.

20.

| A. | R. | p. | ft. | in. |
|-----|----|----|--------------------|-----|
| 144 | 3 | 0 | 0 | 0 |
| 18 | 1 | 17 | 200 | 100 |
| 126 | 1 | 22 | 71 $\frac{1}{4}$ | 44 |
| | | | $\frac{1}{4} = 36$ | |

| | | | | |
|-----|---|----|----|----|
| 126 | 1 | 22 | 71 | 80 |
|-----|---|----|----|----|

NOTE. The $\frac{1}{4}$ of a foot, which is 36 inches, is added to the 44 inches, and their sum is 80 inches.

23.

| gal. | qt. | pt. |
|------|-----|-----|
| 169 | 0 | 0 |
| 76 | 3 | 1 |
| 92 | 0 | 1 |

25.

| y. | in. | ds. | h. | m. | sec. |
|----|-----|-----|----|----|------|
| 83 | 0 | 0 | 0 | 0 | 0 |
| 47 | 10 | 27 | 18 | 50 | 14 |
| 35 | 1 | 2 | 5 | 9 | 46 |

27.

There is no difference between any of the numbers in this question.

29.

| yd. | qr. | na. |
|-----|-----|-----|
| 17 | 3 | 0 |
| 3 | 3 | 2 |
| 4 | 1 | 3 |
| 8 | 1 | 1 |
| 9 | 1 | 3 |

21.

| cord. | ft. | in. |
|-------|-----|------|
| 18 | 0 | 0 |
| 3 | 100 | 1000 |
| 14 | 27 | 728 |

22.

| T. | ft. | in. |
|----|-----|-----|
| 17 | 0 | 0 |
| 5 | 18 | 765 |
| 11 | 21 | 963 |

24.

| ch. | bu. | pk. | qt. |
|-----|-----|-----|-----|
| 17 | 18 | 0 | 0 |
| 5 | 20 | 1 | 7 |
| 11 | 38 | 2 | 1 |

26.

| s. | ° | ' | " |
|----|----|----|----|
| 11 | 15 | 36 | 15 |
| 5 | 18 | 50 | 18 |
| 5 | 26 | 45 | 57 |

28.

| lb. | oz. | dwt. | gr. |
|-----|-----|------|-----|
| 106 | 0 | 0 | 0 |
| 5 | 11 | 12 | 15 |
| 3 | 0 | 13 | 14 |
| 7 | 11 | 14 | 23 |
| 17 | 0 | 1 | 4 |
| 88 | 11 | 18 | 20 |

30.

| s. | ° | ' | " |
|----|----|----|----|
| 3 | 18 | 14 | 35 |
| 11 | 25 | 30 | 50 |
| 3 | 22 | 43 | 45 |

NOTE. To perform this question, we add 12 signs to the longitude of the star, and, from their sum, subtract the longitude of the planet, because all the planets move eastward, as seen from the sun.

Section 13. (p. 58.)

REDUCTION DESCENDING.

| 2. | 3. | 4. |
|----------|--------------|-------------------|
| £379 | £46 18s. 5d. | 37 lb. |
| 20 | 20 | 12 |
| <hr/> | <hr/> | <hr/> |
| 7580 | 938 | 444 |
| 12 | 12 | 20 |
| <hr/> | <hr/> | <hr/> |
| 15160 | 1876 | 8880 |
| 7580 | 9385 | 24 |
| <hr/> | <hr/> | <hr/> |
| 90960 | 11261 | 35520 |
| 4 | | 17760 |
| <hr/> | | <hr/> |
| 363840 | | 213120 |
| 5. | 6. | 7. |
| 17 lb. | 15 tons | 17 cwt. 3qr. 19lb |
| 12 | 20 | 4 |
| <hr/> | <hr/> | <hr/> |
| 204 | 300 | 71 |
| 8 | 4 | 28 |
| <hr/> | <hr/> | <hr/> |
| 1632 | 1200 | 577 |
| 3 | 28 | 143 |
| <hr/> | <hr/> | <hr/> |
| 4896 | 9600 | 2007 |
| 20 | 2400 | |
| <hr/> | <hr/> | |
| 97920 | 33600 | |
| | 16 | |
| | <hr/> | |
| | 201600 | |
| | 33600 | |
| | <hr/> | |
| | 537600 | |
| 8. | 9. | 10. |
| 144 yds. | 57 E. E. | 97 miles |
| 4 | 5 | 8 |
| <hr/> | <hr/> | <hr/> |
| 576 | 285 | 776 |
| | 4 | 40 |
| | <hr/> | <hr/> |
| | 1140 | 31040 |

11.

7 fur.
40

280
16½

1680
280

140
4620
12

55440

12.

95,000,000 miles.
8

760000000
40

30400000000
16½

182400000000
30400000000

15200000000
501600000000
12

6,019,200,000,000

13.

deg. m. fur. rd.
48 18 7 18
69½

440
289
24

3354
8

26839
40

1073578
16½

6441468
1073578
536789

17714037

14.

Acres.
76
4

304
40

12160
272½

24320
85120
24320
3040

3310560

15.

Acres.
144
4

576
40

23040
30½

691200
5760

696960

| 16. | | 17. | | | 18. |
|---------------|-----|--------|---------------|--------|---------|
| Square miles. | | A. | R. | p. ft. | Tons. |
| 25 | | 7 | 3 | 16 | 218 |
| 640 | | 4 | | | 15 |
| 1000 | | 31 | | | 40 |
| 150 | | 40 | | | 600 |
| 16000 | | 1256 | | | 1728 |
| 4 | | 272½ | | | 4800 |
| 64000 | | 2512 | | | 1200 |
| 40 | | 8792 | | | 4200 |
| 2560000 | | 2512 | | | 600 |
| 272½ | | 314 | | | 1036800 |
| 5120000 | | 218 | | | |
| 17920000 | | 342164 | | | |
| 5120000 | | | | | |
| 640000 | | | | | |
| 696960000 | | | | | |
| 144 | | | | | |
| 2787840000 | | | | | |
| 2787840000 | | | | | |
| 696960000 | | | | | |
| 100362240000 | | | | | |
| 19. | | 20. | 21. | 22. | 23. |
| Cords. | ft. | hhd. | hhd. gal. qt. | hhd. | bu. |
| 19 | 116 | 7 | 5 | 17 | 3 |
| 128 | | 63 | 63 | 54 | 4 |
| 158 | | 441 | 382 | 68 | 228 |
| 39 | | 4 | 4 | 85 | 8 |
| 20 | | 1764 | 1331 | 918 | 1824 |
| 2548 | | 2 | | 4 | 2 |
| 1728 | | 3528 | | 3672 | 3648 |
| 20384 | | | | 2 | |
| 5096 | | | | 7344 | |
| 17836 | | | | | |
| 2548 | | | | | |
| 4402944 | | | | | |

| 24. | 25. | 26. | 27. |
|--------------|--------------|-----------------|--|
| ch. bu. pk. | da. | da. h. | yr. |
| 15 16 3 | 57 | 365 6 | 1842 |
| 36 | 24 | 24 | 365 $\frac{1}{2}$ |
| <u>96</u> | <u>228</u> | <u>1466</u> | <u>9210</u> |
| 46 | 114 | 730 | 11052 |
| <u>556</u> | <u>1368</u> | <u>8766</u> | <u>5526</u> |
| 4 | 60 | 60 | 460 $\frac{1}{2}$ |
| <u>2227</u> | <u>82080</u> | <u>525960</u> | <u>672790 $\frac{1}{2}$</u> |
| 8 | | 60 | 24 |
| <u>17816</u> | | <u>31557600</u> | <u>2691160</u> |
| | | | 1345580 |
| | | | 12 |
| | | | <u>16146972</u> |

| 28. |
|-------------|
| s. d. t. n. |
| 8 14 18 17 |
| <u>30</u> |
| 254 |
| <u>60</u> |
| 15258 |
| <u>60</u> |
| 915497 |

Section 14. (p. 60.)

REDUCTION ASCENDING.

| 2. | 3. | 4. |
|------------------|----------------------|-----------------|
| 4) 363840 qr. | 12) 11261 d. | 24) 213120 gr. |
| <u>12) 90960</u> | <u>20) 938 5d.</u> | <u>20) 8880</u> |
| 20) 7580 | <u>£ 46 18s. 5d.</u> | 12) 444 |
| <u>£ 379</u> | | 37 lb |

5.

$$20 \overline{) 97920} \text{ gr.}$$

$$3 \overline{) 4896}$$

$$8 \overline{) 1632}$$

$$12 \overline{) 204}$$

17 lb.

6.

$$16 \overline{) 537600} \text{ oz.}$$

$$28 \overline{) 33600}$$

$$4 \overline{) 1200}$$

$$20 \overline{) 300}$$

15 tons.

7.

$$28 \overline{) 2007} \text{ lb.}$$

$$4 \overline{) 71} \text{ 19lb.}$$

17 cwt. 3qr. 19lb.

8.

$$4 \overline{) 576} \text{ qr.}$$

$$144 \text{ yd.}$$

9.

$$4 \overline{) 1140} \text{ na.}$$

$$5 \overline{) 285}$$

57 E. E.

10.

$$40 \overline{) 31040} \text{ rd.}$$

$$8 \overline{) 776}$$

97 miles.

11.

$$12 \overline{) 55440} \text{ in.}$$

$$3 \overline{) 4620}$$

$$5\frac{1}{2} \overline{) 1540}$$

$$2 \quad 2$$

$$11 \overline{) 3080}$$

$$40 \overline{) 280}$$

7 fur.

12.

$$12 \overline{) 60192000000000} \text{ in.}$$

$$3 \overline{) 501600000000}$$

$$5\frac{1}{2} \overline{) 167200000000}$$

$$2 \quad 2$$

$$11 \overline{) 334400000000}$$

$$40 \overline{) 30400000000}$$

$$8 \overline{) 760000000}$$

95,000,000 miles.

13.

$$3 \overline{) 17714037} \text{ feet.}$$

$$5\frac{1}{2} \overline{) 5904679}$$

$$2 \quad 2$$

$$11 \overline{) 11809358}$$

$$40 \overline{) 1073578}$$

$$8 \overline{) 26839} \text{ 18rd.}$$

$$69\frac{1}{2} \overline{) 3354} \text{ 7fur.}$$

$$2 \quad 2$$

$$139 \overline{) 6708}$$

48°. 18m.

[7fur. 18rd.]

14.

$$\begin{array}{r} 272\frac{1}{4}) 3310560 \text{ ft.} \\ \underline{4} \qquad \qquad \underline{4} \\ 1089) 13242240 \\ \underline{40) 12160} \\ \underline{4) 304} \end{array}$$

76 acres.

15.

$$\begin{array}{r} 30\frac{1}{4}) 696960 \text{ yd.} \\ \underline{4} \qquad \qquad \underline{4} \\ 121) 2787840 \\ \underline{40) 23040} \\ \underline{4) 576} \end{array}$$

144 acres.

16.

$$\begin{array}{r} 144) 100362240000 \text{ in.} \\ \underline{272\frac{1}{4}) 696960000} \\ \underline{4} \qquad \qquad \underline{4} \\ 1089) 2787840000 \\ \underline{40) 2560000} \\ \underline{4) 64000} \\ 640) 16000 \end{array}$$

25 acres.

17.

$$\begin{array}{r} 272\frac{1}{4}) 342164 \text{ sq. ft.} \\ \underline{4} \qquad \qquad \underline{4} \\ 1089) 1368656 \\ \underline{40) 1256} \text{ 218ft.} \\ \underline{4) 31} \text{ 16p.} \\ \text{7A. 3R.} \\ \text{[16p. 218ft.} \end{array}$$

18.

$$\begin{array}{r} 1728) 1036800 \text{ in.} \\ \underline{40) 600} \end{array}$$

15 tons.

19.

$$\begin{array}{r} 1728) 4402944 \text{ in.} \\ \underline{128) 2548} \end{array}$$

19 cd. 116ft.

20.

$$\begin{array}{r} 2) 3528 \text{ pt.} \\ \underline{4) 1764} \\ 63) 441 \\ \underline{7 \text{ hhd.}} \end{array}$$

21.

$$\begin{array}{r} 4) 1331 \text{ qt.} \\ \underline{63) 332} \text{ 3 qt.} \\ 5 \text{ hhd. 17 gal. 3 qt.} \end{array}$$

22.

$$\begin{array}{r} 2) 7344 \text{ pt.} \\ \underline{4) 3672} \\ 54) 918 \\ \underline{17 \text{ hhd.}} \end{array}$$

23.

$$\begin{array}{r} 2) 3648 \text{ pt.} \\ \underline{8) 1824} \\ \underline{4) 228} \\ 57 \text{ bu.} \end{array}$$

24.

$$\begin{array}{r} 8) 17816 \text{ qt.} \\ \underline{4) 2227} \\ 36) 556 \text{ 3 pk.} \\ \underline{15 \text{ ch. 16 bu. 3 pk.}} \end{array}$$

25.

$$\begin{array}{r} 60) 82080 \text{ m.} \\ \underline{24) 1368} \\ \underline{57 \text{ da.}} \end{array}$$

| | |
|--|--|
| 26. $\begin{array}{r} 60 \overline{) 31557600} \text{ sec.} \\ 60 \overline{) 525960} \\ 24 \overline{) 8766} \\ 365 \text{ da. 6h.} \end{array}$ | 27. $\begin{array}{r} 24 \overline{) 16146972} \text{ hours.} \\ 365 \overline{) 672790} \\ 4 \qquad \qquad 4 \\ 1461 \overline{) 2691162} \\ 1842 \text{ years.} \end{array}$ |
| 28. $\begin{array}{r} 60 \overline{) 915497''} \\ 60 \overline{) 15258} \quad 17'' \\ 30 \overline{) 254} \quad 18' \\ 8 \text{ S. } 14^{\circ} \text{ } 18' \text{ } 17''. \end{array}$ | |

Section 15. (p. 61.)

MISCELLANEOUS.

1. $\$ 175 \div 5 = 35$ reams, Ans.
2. $\$ 217.50 \div 7.50 = 29$ barrels, Ans.
3. $\$ 4875 \div 75 = 65$ tons, Ans.
4. $\$ 1728 \div 4 = 432$ yd. Ans.
5. $\$ 8.40 \div 20 = 42$ cents, Ans.
6. 17 bu. 3 pk. = 71 pk.; $\$ 2.40 \div 4 = .60$; $71 \times .60 = \$ 42.60$ Ans.
7. $\$ 3.50 \times 17 = \$ 129.50$ Ans.
8. 5 cwt. 3 qr. 18 lb. = 662 lb.; $662 \times .09 = \$ 59.58$, price of the sugar; $\$ 1.75 \times 25 = \$ 43.75$, price of the apples.
 $\$ 59.58 - \$ 43.75 = \$ 15.83$ Ans.
9. $\$ 8.73 \div 97 = 9$ cents; $147 \times 9 = \$ 13.23$ Ans.
10. $45 \div 9 = 5$ miles; $59 \times 5 = 295$ miles, Ans.
11. $\$ 18.40 \div 20 = 92$ cents; $47 \times 92 = \$ 43.24$ Ans.
12. $\$ 422.50 \div 65 = \$ 6.50$; $\$ 6.50 \times 15 = \$ 97.50$ Ans.
13. $\$ 2025 \div 45 = \$ 45$; $\$ 45 \times 180 = \$ 8100$ Ans.
14. $\$ 3.45 \div 5 = \$ 0.69$; $\$ 0.69 \times 11 = \$ 7.59$ Ans.
15. $\$ 1480 \div 25 = \$ 59.20$; $\$ 59.20 \div 160 = \$ 0.37$;
 $37\text{A. } 2\text{R. } 18\text{p.} = 6018\text{p.}$; $\$ 0.37 \times 6018 = \$ 2226.66$
 Ans.

16. $\$10.08 \div 144 = \0.07 ; $359 \times .07 = \$25.13$ Ans.
 17. $\$77.13 \div 857 = \0.09 ; $359 \times .09 = \$32.31$ Ans.
 18. $\$187.53 \div 987 = \0.19 ; $329 \times .19 = \$62.51$ Ans.
 19. $\$26.32 \div 47 = \0.56 ; $39 \times .56 = \$21.84$ Ans.
 20. $15 \times 10 = 150$; $150 \div 75 = 2$ days, Ans.
 21. $10 \times 9 = 90$; $90 \div 18 = 5$ weeks, Ans.
 22. $10 \times 9 = 90$; $90 \div .15 = 6$ days, Ans.
 23. 2lb. 7oz. = 31oz. ; $\$46.50 \div 31 = \1.50 ; $\$1.50 \times 12 = 18.00$ Ans.
 24. 3T. 1cwt. 0qr. 18lb. = 6350lb. ; $6850 \times 12 = \$822.00$; $6850 \times 9 = \$616.50$; $\$822.00 - \$616.50 = \$205.50$ Ans.
 25. 37m. 7fur. 29rd. = 12149rd. ; $12149 \times 5.75 = \$69356.75$ Ans.
 26. 100gal. = 400qt. ; 15gal. 3qt. = 63qt. ; $400 - 63 = 337$ qt. ; $337 \times .12 = \$40.44$; $\$40.44 - \$25.00 = \$15.44$ Ans.
 27. $\$75 \times 144 = \10800 ; 765A. 3R. 14p. — 144A. = 621A. 3R. 14p. ; 621A. 3R. 14p. = 99494p. ; $99494 \times 1.67 = \$166154.98$; $\$166154.98 + \$10800 = \$176954.98$ Ans.
 28. 15T. 3cwt. 15lb. = 33951lb. ; $33951 \times .6 = \$2037.06$; 6T. 1cwt. 1qr. 18lb. = 13598lb. ; $13598 \times 5 = \$679.90$; $33951 - 13598 = 20353$; $20353 \times 10 = \$2035.30$; $\$2035.30 + \$679.90 = \$2715.20$; $\$2715.20 - \$2037.06 = \$678.14$ Ans.
 29. 89A. 3R. 39p. + 97A. 1R. 15p. + 117A. 1R. 19p. = 304A. 2R. 33p. ; 304A. 2R. 33p. — 175A. 3R. 29p. = 128A. 3R. 4p. = 20604p. ; $20604 \times \$1.25 = \25755.00 Ans.
 30. $\$1.27 \times 2 = \2.54 ; $\$0.19 \times 3 = \0.57 ; $\$0.37 \times 2 = \0.74 ; $\$2.54 + \$3.75 + \$0.57 + \$0.74 = \$7.60$; $\$10.00 - \$7.60 = \$2.40$ Ans.

Section 16. (p. 64.)

COMPOUND MULTIPLICATION.

11.

| deg. | m. | fur. | rd. |
|-------|-------------------|------|-----|
| 18 | 12 | 6 | 18 |
| <hr/> | | | |
| 145 | 32 $\frac{1}{2}$ | 3 | 24 |
| | $\frac{1}{2} = 4$ | | 0 |
| <hr/> | | | |
| 145 | 32 | 7 | 24 |

NOTE. As half a mile is 4 furlongs, we add the 4 furlongs to the 3 furlongs, which make 7 furlongs.

27.

| m. | fur. | rd. |
|--------------------------|------|-----|
| 3 | 7 | 18 |
| $\times 30 = 5 \times 6$ | | |
| | 5 | |
| <hr/> | | |
| 19 | 5 | 10 |
| | 6 | |
| <hr/> | | |
| 117 | 7 | 20 |

28.

| T. | cwt. | qr. | lb. |
|---------------------------|------|-----|-----|
| 2 | 7 | 3 | 18 |
| $\times 84 = 7 \times 12$ | | | |
| | | 7 | |
| <hr/> | | | |
| 16 | 15 | 1 | 14 |
| | | 12 | |
| <hr/> | | | |
| 201 | 4 | 2 | 0 |

29.

| yd. | qr. | na. |
|---------------------------|-----|-----|
| 7 | 3 | 2 |
| $\times 72 = 6 \times 12$ | | |
| | 6 | |
| <hr/> | | |
| 47 | 1 | 0 |
| | 12 | |
| <hr/> | | |
| 567 | 0 | 0 |

30.

| yd. | qr. | na. |
|-----------------------------|-----|-----|
| 3 | 2 | 1 |
| $\times 132 = 12 \times 11$ | | |
| | 12 | |
| <hr/> | | |
| 42 | 3 | 0 |
| | 11 | |
| <hr/> | | |
| 470 | 1 | 0 |

31.

| lb. | oz. | dr. |
|---------------|-----|-------------------|
| 17 | 10 | 13 |
| $\times 62 =$ | | |
| | 5 | $5 \times 12 + 2$ |
| <hr/> | | |
| 88 | 6 | 1 |
| | 12 | |
| <hr/> | | |
| 1060 | 8 | $12 = 60$ |
| | 35 | $5 \quad 10 = 2$ |
| <hr/> | | |
| 1095 | 14 | $6 = 62$ |

32.

| £ | s. | d. |
|---------------|----|-----------------------------|
| 2 | 17 | 9 $\frac{1}{2}$ |
| $\times 97 =$ | | |
| | 12 | $12 \times 8 + 1$ |
| <hr/> | | |
| 34 | 13 | 6 |
| | 8 | |
| <hr/> | | |
| 277 | 8 | $0 = 96$ |
| | 2 | $17 \quad 9\frac{1}{2} = 1$ |
| <hr/> | | |
| 280 | 5 | $9\frac{1}{2} = 97$ |

33.

[illegible]

34.

| | | | | | | |
|-------|------|-----|-----|-------|------|---------|
| bu. | pk. | qt. | pt. | | | |
| 27 | 3 | 6 | 1 | | 98 | |
| | | | 98 | | 1 | |
| 2739 | 1 | 5 | 0 | | 2)98 | |
| | | | | | 49 | Opt. |
| 98 | | | | 98 | | 98 |
| 6 | | | | 3 | | 27 |
| 588 | | | | 294 | | 2646 |
| 49 | | | | 79 | | 98 |
| 8)687 | | | | 4)373 | | 2739bu. |
| 79 | 5qt. | | | 93 | 1pk. | |

35.

$$\begin{array}{r} \text{yd.} \quad \text{qr.} \quad \text{na.} \\ 7 \quad 3 \quad 2 \times 48 = 6 \times 8 \\ \hline 47 \quad 1 \quad 0 \\ \hline 8 \\ \hline 378 \quad 0 \quad 0 \end{array}$$

38.

| | | | | | | | | |
|-----|----|----|-----|-----------------|-----|---|-----|------|
| A. | R. | p. | yd. | ft. | in. | | | |
| 13 | 3 | 14 | 18 | 7 | 76 | | 76 | |
| | | | | | 19 | | 19 | |
| 262 | 3 | 37 | 24 | $\frac{1}{4}$ | 8 | 4 | 144 | 1444 |
| | | | | $\frac{1}{4}=2$ | 36 | | | 10 |
| 262 | 3 | 37 | 25 | 1 | 40 | | | 4in. |

| | | | | | | | |
|----|-----|------|--|--|-----|---------------|------|
| | 7 | | | | 18 | | 14 |
| | 19 | | | | 19 | | 19 |
| | 133 | | | | 342 | | 266 |
| | 10 | | | | 15 | | 11 |
| 9) | 143 | | | | 30 | $\frac{1}{4}$ | 357 |
| | | | | | 4 | | 4 |
| | 15 | 8ft. | | | | | |
| | | | | | 121 | 1428 | (11 |
| | | | | | | | 37p. |

NOTE. We add the $\frac{1}{4}$ of a yard, which is equal to 2 feet 36 inches, to 8 feet 4 inches, and find their sum to be 1 yard 1 foot 40 inches. The 1 yard we add to 24 yards, and the sum is 25 yards.

| | |
|----|-------------------|
| | 218 |
| | 121 |
| 4) | 97 |
| | 24 |
| | $\frac{1}{4}$ yd. |

Section 17. (p. 68.)

COMPOUND DIVISION.

10.

| | | | | |
|----|-----|------|-----|-----|
| | m. | fur. | rd. | ft. |
| 6) | 587 | 4 | 8 | 12 |
| | 97 | 7 | 14 | 13 |

12.

| | | | | |
|----|-----|-----|-----|-----|
| | rd. | yd. | ft. | in. |
| 9) | 213 | 2 | 0 | 9 |
| | 23 | 3 | 2 | 9 |

14.

| | | | |
|----|----|----|----|
| | £. | s. | d. |
| 7) | 6 | 11 | 3 |
| | 18 | 9 | |

11.

| | | | | |
|----|------|----|------|-----|
| | deg. | m. | fur. | rd. |
| 8) | 145 | 32 | 7 | 24 |
| | 18 | 12 | 6 | 18 |

13.

| | | | | |
|-----|------|-----|-----|-----|
| | fur. | rd. | ft. | in. |
| 10) | 98 | 0 | 4 | 2 |
| | 9 | 32 | 0 | 5 |
| | 9 | 31 | 16 | 11 |

15.

| | | | |
|----|-----|------|-----|
| | m. | fur. | rd. |
| 9) | 112 | 1 | 21 |
| | 12 | 3 | 29 |

16.

$$\begin{array}{r} \text{T.} \quad \text{cwt.} \quad \text{qr.} \quad \text{lb.} \\ 8) 21 \quad 5 \quad 1 \quad 12 \\ \hline 2 \quad 13 \quad 0 \quad 19 \end{array}$$

18.

$$\begin{array}{r} \text{lb.} \quad \text{oz.} \quad \text{dwt.} \quad \text{gr.} \\ 12) 3 \quad 10 \quad 11 \quad 0 \\ \hline 3 \quad 17 \quad 14 \end{array}$$

20.

$$\begin{array}{r} \text{s.} \quad \text{o.} \quad \text{i.} \quad \text{".} \\ 10) 4 \quad 11 \quad 55 \quad 50 \\ \hline 13 \quad 11 \quad 35 \end{array}$$

22.

$$\begin{array}{r} \text{A.} \quad \text{R.} \quad \text{p.} \quad \text{yd.} \quad \text{ft.} \quad \text{in.} \\ 12) 34 \quad 0 \quad 32 \quad 8 \quad 5 \quad 48 \\ \hline 2 \quad 3 \quad 16 \quad 0 \quad 6 \quad 64 \\ \quad \quad \quad 1 \\ \hline 2 \quad 3 \quad 15 \quad 0 \quad 6 \quad 64 \\ \quad \quad \quad \quad 30 \quad 2 \quad 36 \\ \hline 2 \quad 3 \quad 15 \quad 30 \quad 8 \quad 100 \end{array}$$

23.

$$\begin{array}{r} \text{cord.} \quad \text{ft.} \\ 9) 24 \quad 105 \\ \hline 2 \quad 97 \end{array}$$

27.

$$\begin{array}{r} \text{m.} \quad \text{fur.} \quad \text{rd.} \\ 5) 117 \quad 7 \quad 20 \\ \hline 6) 23 \quad 4 \quad 28 \\ \hline 3 \quad 7 \quad 18 \end{array}$$

29.

$$\begin{array}{r} \text{yd.} \quad \text{qr.} \quad \text{na.} \\ 6) 567 \quad 0 \quad 0 \\ \hline 12) 94 \quad 2 \quad 0 \\ \hline 7 \quad 3 \quad 2 \end{array}$$

17.

$$\begin{array}{r} \text{gal.} \quad \text{qt.} \quad \text{pt.} \\ 12) 598 \quad 2 \quad 0 \\ \hline 49 \quad 3 \quad 1 \end{array}$$

19.

$$\begin{array}{r} \text{T.} \quad \text{ft.} \\ 7) 55 \quad 19 \\ \hline 7 \quad 37 \end{array}$$

21.

$$\begin{array}{r} \text{lb.} \quad \text{3.} \quad \text{3.} \quad \text{D.} \quad \text{gr.} \\ 9) 24 \quad 8 \quad 3 \quad 1 \quad 10 \\ \hline 2 \quad 8 \quad 7 \quad 1 \quad 10 \end{array}$$

NOTE. The first answer to this question is a correct one; but, if we wish to obtain an answer corresponding to the one in Compound Multiplication, we must subtract one pole from the 16 poles, and then add its equivalent, $30\frac{1}{4}$ square yards, which is 30 yd. 2 ft. 36 in., to the yards, feet, and inches remaining, and we obtain another answer of the same value.

24.

$$\begin{array}{r} \text{ch.} \quad \text{bu.} \quad \text{pk.} \quad \text{qt.} \quad \text{pt.} \\ 8) 25 \quad 17 \quad 3 \quad 4 \quad 0 \\ \hline 3 \quad 6 \quad 2 \quad 7 \quad 1 \end{array}$$

28.

$$\begin{array}{r} \text{T.} \quad \text{cwt.} \quad \text{qr.} \quad \text{lb.} \\ 12) 201 \quad 4 \quad 2 \quad 0 \\ \hline 7) 16 \quad 15 \quad 1 \quad 14 \\ \hline 2 \quad 7 \quad 3 \quad 18 \end{array}$$

30.

$$\begin{array}{r} \text{yd.} \quad \text{qr.} \quad \text{na.} \\ 12) 470 \quad 1 \quad 0 \\ \hline 11) 39 \quad 0 \quad 3 \\ \hline 3 \quad 2 \quad 1 \end{array}$$

31.62) 1095 ^{lb.} 14 ^{oz.} 6 (17lb.62

475

434

41

16

250

42

62) 670 (1oz.

62

50

16

306

50

62) 806 (13dr.

62

186

186

32.97) 280 ^{£.} 5 ^{s.} 9½ (2£.194

86

20

97) 1725 (17s.

97

755

679

76

12

97) 921 (9d.

873

48

4

97) 194 (2qr.

194**33.**38) 662 ^{m.} 4 ^{fur.} 28 ^{rd.} 3 ^{yd.} 2 ^{ft.} 2 (17m.38

282

266

16

8

38) 132 (3fur.

114

18

40

38) 748 (19rd.

38

368

342

26

(Carried up.)

(Brought up.)

26

5½

133

13

38) 146 (3yd.

114

32

3

38) 98 (2ft.

76

22

12

38) 266 (7in.

266

34.

98) ^{bu.}2739 ^{pk.}1 ^{qt.}5 ^{pt.}0 (27bu.

196

779

686

93

4

98)373(3pk.

294

79

8

98)637(6qt.

588

49

2

98)98(1pt.

98

35.

48) ^{yd.}378 ^{qr.}0 ^{na.}0 (7yd.

336

42

4

48)168(3qr.

144

24

4

48)96(2na.

96

36.

19) ^{A.}262 ^{R.}3 ^{p.}37 ^{yd.}25 ^{ft.}1 ^{in.}40 (13A.

19

72

57

15

4

19)63(3R.

57

6

40

19)277(14p.

19

87

76

11

30½

355

2½

357½

(Brought up.)

19)357½(18yd.

19

167

152

15½

9

19)142½(7ft

133

9½

144

36

36

940

108

19)1444(76in.

133

114

114

(Carried up.)

Section 18. (p. 71.)

BILLS.

W. GREENLEAF.

$$\begin{aligned}
 \$0.50 \times 86 &= \$43.00 \\
 .86 \times 90 &= 77.40 \\
 11.00 \times 18 &= 198.00 \\
 3.50 \times 23 &= 80.50 \\
 .62 \times 14 &= 8.68 \\
 12.12 \times 12 &= 145.44 \\
 12.00 \times 46 &= 552.00 \\
 \hline
 &= \$1105.02
 \end{aligned}$$

A. DOW.

$$\begin{aligned}
 \$23.75 \times 37 &= \$878.75 \\
 17.50 \times 42 &= 735.00 \\
 99.00 \times 43 &= 4257.00 \\
 175.00 \times 12 &= 2100.00 \\
 7.00 \times 19 &= 133.00 \\
 1.52 \times 23 &= 34.96 \\
 \hline
 &= \$8138.71
 \end{aligned}$$

J. KIMBALL.

$$\begin{aligned}
 \$0.63 \times 14 &= \$8.82 \\
 .88 \times 12 &= 10.56 \\
 .62 \times 23 &= 14.26 \\
 1.27 \times 16 &= 20.32 \\
 2.25 \times 17 &= 38.25 \\
 \hline
 &= \$92.21
 \end{aligned}$$

J. SMITH.

$$\begin{aligned}
 \$0.75 \times 82 &= \$61.50 \\
 .92 \times 89 &= 81.88 \\
 .50 \times 24 &= 12.00 \\
 \hline
 &= \$155.38
 \end{aligned}$$

L. WEBSTER.

$$\begin{aligned}
 \$0.18 \times 6 &= \$1.08 \\
 .20 \times 12 &= 2.40 \\
 1.80 \times 6 &= 10.80 \\
 .26 \times 30 &= 7.80 \\
 \hline
 &= \$22.08
 \end{aligned}$$

N. WEBSTER.

$$\begin{aligned}
 \$1.20 \times 80 &= \$96.00 \\
 3.00 \times 17 &= 51.00 \\
 1.08 \times 19 &= 20.52 \\
 .75 \times 23 &= 17.25 \\
 \hline
 &= \$184.77
 \end{aligned}$$

S. OSGOOD.

$$\begin{aligned}
 \$0.20 \times 27 &= \$5.40 \\
 3.90 \times 10 &= 39.00 \\
 4.75 \times 7 &= 33.25 \\
 2.93 \times 19 &= 55.67 \\
 .37 \times 20 &= 7.40 \\
 \hline
 &= \$140.72
 \end{aligned}$$

E. SMITH.

$$\begin{aligned}
 \$0.30 \times 49 &= \$14.70 \\
 2.56 \times 46 &= 117.76 \\
 2.91 \times 140 &= 407.40 \\
 2.00 \times 169 &= 338.00 \\
 1.37 \times 153 &= 209.61 \\
 \hline
 &= \$1087.47
 \end{aligned}$$

Sect. 18.] GREENLEAF'S INTRODUCTION.

25.

London, June 19, 1842.

Mr. Edward Snow, of Lowell, U. S.

Bought of Smith, Davis & Co.

| | | | | | |
|----------|------------------|--------------|------|------|-----|
| 241 yds. | Red Broadcloth, | at 16s. 4d., | £196 | 16s. | 4d. |
| 412 " | Blue do. | " 8s. 9d., | 180 | 5 | 0 |
| 510 " | White do. | " 13s. 5½d., | 342 | 13 | 1½ |
| 424 " | Green do. | " 14s. 6½d., | 307 | 16 | 10 |
| 169 " | Black Velvet, | " 12s. 8½d., | 107 | 7 | 8½ |
| 349 " | Blk. Kerseymere, | " 17s. 6½d., | 305 | 14 | 9½ |
| 648 " | Carpet, | " 14s. 9½d., | 479 | 5 | 0 |

£1919 18s. 9½d.

OPERATION.

| 1. | | | 2. | | | 3. | | |
|------|------|-------|------|-----|-------|------|------|--------|
| £ | s. | d. | £ | s. | d. | £ | s. | d. |
| 0 | 16 | 4 × 1 | 0 | 8 | 9 × 2 | 0 | 13 | 5½ |
| | | 10 | | | 10 | | | 10 |
| 8 | 3 | 4 × 4 | 4 | 7 | 6 × 1 | 6 | 14 | 4½ × 1 |
| | | 10 | | | 10 | | | 10 |
| 81 | 13 | 4 | 43 | 15 | 0 | 67 | 3 | 9 |
| | | 2 | | | 4 | | | 5 |
| 163 | 6 | 8 | 175 | 0 | 0 | 335 | 18 | 9 |
| 32 | 13 | 4 | 4 | 7 | 6 | 6 | 14 | 4½ |
| | 16 | 4 | | 17 | 6 | £342 | 13s. | 1½d. |
| £196 | 16s. | 4d. | £180 | 5s. | 0d. | | | |

| 4. | | | 5. | | |
|------|------|--------|------|-----|--------|
| £ | s. | d. | £ | s. | d. |
| 0 | 14 | 6½ × 4 | 0 | 12 | 8½ × 9 |
| | | 10 | | | 10 |
| 7 | 5 | 2½ × 2 | 6 | 7 | 1 × 6 |
| | | 10 | | | 10 |
| 72 | 12 | 1 | 63 | 10 | 10 |
| | | 4 | 38 | 2 | 6 |
| 290 | 8 | 4 | 5 | 14 | 4½ |
| 14 | 10 | 5 | £107 | 7s. | 8½d. |
| 2 | 18 | 1 | | | |
| £307 | 16s. | 10d. | | | |

c

$$\begin{array}{r}
 \text{6.} \\
 \begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 0 \quad 17 \quad 6\frac{1}{4} \times 9 \\
 \hline
 10 \\
 8 \quad 15 \quad 2\frac{1}{2} \times 4 \\
 \hline
 10 \\
 87 \quad 12 \quad 1 \\
 \hline
 3 \\
 262 \quad 16 \quad 3 \\
 35 \quad 0 \quad 10 \\
 7 \quad 17 \quad 8\frac{1}{4} \\
 \hline
 \text{£} 305 \quad 14 \text{ s.} \quad 9\frac{1}{4} \text{ d.}
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \text{7.} \\
 \begin{array}{r}
 \text{£} \quad \text{s.} \quad \text{d.} \\
 0 \quad 14 \quad 9\frac{1}{2} \times 8 \\
 \hline
 10 \\
 7 \quad 7 \quad 11 \times 4 \\
 \hline
 10 \\
 73 \quad 19 \quad 2 \\
 \hline
 6 \\
 443 \quad 15 \quad 0 \\
 29 \quad 11 \quad 8 \\
 5 \quad 18 \quad 4 \\
 \hline
 \text{£} 479 \quad 5 \text{ s.} \quad 0 \text{ d.}
 \end{array}
 \end{array}$$

Section 20. (p. 78.)

VULGAR FRACTIONS.

CASE I.

$$\begin{array}{r}
 \text{2.} \quad \text{3.} \quad \text{4.} \\
 85)95(1 \quad 72)168(2 \quad 119)121(1 \\
 \underline{85} \quad \underline{144} \quad \underline{119} \\
 10)85(8 \quad \text{Ans. } 24)72(3 \quad 2)119(59 \\
 \underline{80} \quad \underline{72} \quad \underline{10} \\
 \text{Ans. } 5)10(2 \quad \quad \quad \underline{19} \\
 \quad \quad \quad \quad \quad \quad \underline{18} \\
 \quad \quad \quad \quad \quad \quad \text{Ans. } 1)2(2 \\
 \text{5.} \quad \text{6.} \\
 324)586(1 \quad 582)684(1 \\
 \underline{324} \quad \underline{582} \\
 262)324(1 \quad 102)582(5 \\
 \underline{262} \quad \underline{510} \\
 62)262(4 \quad 72)102(1 \\
 \underline{248} \quad \underline{72} \\
 14)62(4 \quad 30)72(2 \\
 \underline{56} \quad \underline{60} \\
 6)14(2 \quad 12)30(2 \\
 \underline{12} \quad \underline{24} \\
 \text{Ans. } 2)6(3 \quad \text{Ans. } 6)12(2 \\
 \quad \quad \quad \underline{6} \quad \quad \quad \underline{12}
 \end{array}$$

| | | | | |
|---|--|---|---|--|
| <p>7.</p> $\begin{array}{r} 32) 172 (5 \\ \underline{160} \\ 12) 32 (2 \\ \underline{24} \\ 8) 12 (1 \\ \underline{8} \\ \text{Ans. } 4) 8 (2 \\ \underline{8} \end{array}$ | <p>8.</p> $\begin{array}{r} 84) 1728 (20 \\ \underline{168} \\ 48) 84 (1 \\ \underline{48} \\ 36) 48 (1 \\ \underline{36} \\ \text{Ans. } 12) 36 (3 \\ \underline{36} \end{array}$ | | | |
| <p>9.</p> <table border="0"> <tr> <td style="vertical-align: top;"> $\begin{array}{r} 16) 20 (1 \\ \underline{16} \\ \text{Ans. } 4) 16 (4 \\ \underline{16} \end{array}$ </td> <td style="vertical-align: top;"> $\begin{array}{r} 4) 26 (6 \\ \underline{24} \\ \text{Ans. } 2) 4 (2 \\ \underline{4} \end{array}$ </td> </tr> </table> | | $\begin{array}{r} 16) 20 (1 \\ \underline{16} \\ \text{Ans. } 4) 16 (4 \\ \underline{16} \end{array}$ | $\begin{array}{r} 4) 26 (6 \\ \underline{24} \\ \text{Ans. } 2) 4 (2 \\ \underline{4} \end{array}$ | |
| $\begin{array}{r} 16) 20 (1 \\ \underline{16} \\ \text{Ans. } 4) 16 (4 \\ \underline{16} \end{array}$ | $\begin{array}{r} 4) 26 (6 \\ \underline{24} \\ \text{Ans. } 2) 4 (2 \\ \underline{4} \end{array}$ | | | |
| <p>10.</p> <table border="0"> <tr> <td style="vertical-align: top;"> $\begin{array}{r} 12) 18 (1 \\ \underline{12} \\ \text{Ans. } 6) 12 (2 \\ \underline{12} \end{array}$ </td> <td style="vertical-align: top;"> $\begin{array}{r} 24) 30 (1 \\ \underline{24} \\ \text{Ans. } 6) 24 (4 \\ \underline{24} \end{array}$ </td> <td style="vertical-align: top;"> $\begin{array}{r} \text{Ans. } 6) 6 (1 \\ \underline{6} \end{array}$ </td> </tr> </table> | | $\begin{array}{r} 12) 18 (1 \\ \underline{12} \\ \text{Ans. } 6) 12 (2 \\ \underline{12} \end{array}$ | $\begin{array}{r} 24) 30 (1 \\ \underline{24} \\ \text{Ans. } 6) 24 (4 \\ \underline{24} \end{array}$ | $\begin{array}{r} \text{Ans. } 6) 6 (1 \\ \underline{6} \end{array}$ |
| $\begin{array}{r} 12) 18 (1 \\ \underline{12} \\ \text{Ans. } 6) 12 (2 \\ \underline{12} \end{array}$ | $\begin{array}{r} 24) 30 (1 \\ \underline{24} \\ \text{Ans. } 6) 24 (4 \\ \underline{24} \end{array}$ | $\begin{array}{r} \text{Ans. } 6) 6 (1 \\ \underline{6} \end{array}$ | | |

CASE II.

| | | |
|---|--|--|
| <p>2.</p> $5) \frac{3}{15} = \frac{1}{5} \text{ Ans.}$ | <p>3.</p> $4) \frac{2}{8} = \frac{1}{2} \text{ Ans.}$ | <p>4.</p> $12) \frac{1}{12} = \frac{1}{12} \text{ Ans.}$ |
| <p>5.</p> $48) \frac{24}{144} = \frac{1}{6} \text{ Ans.}$ | <p>6.</p> $107) \frac{107}{111} = \frac{1}{11} \text{ Ans.}$ | <p>7.</p> $1) \frac{1}{111} = \frac{1}{111} \text{ Ans.}$ |
| <p>8.</p> $81) \frac{81}{567} = \frac{1}{7} \text{ Ans.}$ | <p>9.</p> $1) \frac{1}{111} = \frac{1}{111} \text{ Ans.}$ | <p>10.</p> $2) \frac{1}{111} = \frac{1}{111} \text{ Ans.}$ |

CASE III.

| | | | |
|--|---|--|--|
| <p>7.</p> $\begin{array}{r} 81 \\ 11 \end{array}$ | <p>8.</p> $\begin{array}{r} 157 \\ 12 \end{array}$ | <p>9.</p> $\begin{array}{r} 187 \\ 9 \end{array}$ | <p>10.</p> $\begin{array}{r} 161 \\ 117 \end{array}$ |
| $\begin{array}{r} 91 \\ \frac{1}{11} \text{ Ans.} \end{array}$ | $\begin{array}{r} 187 \\ \frac{1}{12} \text{ Ans.} \end{array}$ | $\begin{array}{r} 169 \\ \frac{1}{9} \text{ Ans.} \end{array}$ | $\begin{array}{r} 18848 \\ \frac{1}{117} \text{ Ans.} \end{array}$ |

$$\begin{array}{r} 11. \\ 43\overline{)111} \\ 117 \\ \hline 5142 \\ 117 \text{ Ans.} \end{array}$$

$$\begin{array}{r} 12. \\ 27\overline{)13} \\ 13 \\ \hline 360 \\ 13 \text{ Ans.} \end{array}$$

$$\begin{array}{r} 13. \\ 111\overline{)111} \\ 111 \\ \hline 12322 \\ 111 \text{ Ans.} \end{array}$$

CASE IV.

$$\begin{array}{r} 6. \\ 111\overline{)1111} (10\overline{)111} \text{ Ans.} \\ 1110 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 7. \\ 876\overline{)1735} (1\overline{)876} \text{ Ans.} \\ 876 \\ \hline 859 \end{array}$$

$$\begin{array}{r} 8. \\ 7\overline{)1000} (142\overline{)7} \text{ Ans.} \\ 28 \\ \hline 20 \\ 14 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 9. \\ 378\overline{)378} (1 \text{ Ans.}) \\ 378 \\ \hline 567 \end{array}$$

$$\begin{array}{r} 10. \\ 1\overline{)567} (567 \text{ Ans.}) \\ 567 \\ \hline \end{array}$$

11. The answer to the 11th question is infinity; because the numerator will contain the denominator an infinite number of times.

12. The answer to the 12th question is zero; because the numerator will not contain the denominator any part of a unit.

13. Any number may be changed to an improper fraction by writing a unit under it.

CASE V.

$$8. \frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} = \frac{72}{72} = 1 \text{ Ans.}$$

$$9. \frac{1}{2} \times \frac{1}{2} \times \frac{2}{3} \times \frac{1}{20} \times \frac{1}{1} = \frac{231}{2720} \text{ Ans.}$$

$$13. \frac{3 \times 4 \times 7 \times 9 \times 13}{7 \times 11 \times 9 \times 10 \times 3} = \frac{52}{110} = \frac{26}{55} \text{ Ans.}$$

CASE VI.

NOTE. In finding the least common multiple of two or more numbers, any one number that will measure another may be cancelled.

$$\begin{array}{r}
 \text{2.} \\
 7) \cancel{7} \quad 1.4 \quad 21 \quad 15 \\
 \hline
 3) 2 \quad 3 \quad 15 \\
 \hline
 2 \quad 1 \quad 5
 \end{array}
 \qquad
 \begin{array}{r}
 \text{3.} \\
 2) \cancel{2} \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \\
 \hline
 5 \quad 3 \quad 7 \quad 4
 \end{array}$$

$2 \times 5 \times 3 \times 7 \times 4 = 840$ Ans.
 $7 \times 3 \times 2 \times 5 = 210$ Ans.

$$\begin{array}{r}
 \text{4.} \\
 4) \cancel{4} \quad 12 \quad 16 \quad 20 \quad 24 \\
 \hline
 2) 4 \quad 5 \quad 6 \\
 \hline
 2 \quad 5 \quad 3
 \end{array}$$

$4 \times 2 \times 2 \times 5 \times 3 = 240$ Ans.

$$\begin{array}{r}
 \text{5.} \\
 2) \cancel{2} \quad 12 \quad 16 \quad 18 \quad 20 \\
 \hline
 2) 6 \quad 8 \quad 9 \quad 10 \\
 \hline
 3) 3 \quad 4 \quad 9 \quad 5 \\
 \hline
 1 \quad 4 \quad 3 \quad 5
 \end{array}$$

$2 \times 2 \times 3 \times 4 \times 3 \times 5 = 720$ days, Ans.

CASE VII.

$$\begin{array}{r}
 \text{2.} \\
 \frac{1}{2}, \frac{1}{3} \\
 2) 4 \quad 6 \\
 \hline
 2 \quad 3 \\
 2 \times 2 \times 3 = 12 \\
 \hline
 4 \mid 3 \times 3 = 9 = \frac{9}{12} \\
 6 \mid 2 \times 5 = 10 = \frac{10}{12}
 \end{array}
 \qquad
 \begin{array}{r}
 \text{3.} \\
 \frac{1}{5}, \frac{1}{15}, \frac{1}{10} \\
 5) 9 \quad 15 \quad 20 \\
 \hline
 3) 9 \quad 3 \quad 4 \\
 \hline
 3 \quad 1 \quad 4 \\
 5 \times 3 \times 3 \times 4 = 180 \\
 180
 \end{array}$$

$9 \mid 20 \times 7 = 140 = \frac{140}{180}$
 $15 \mid 12 \times 4 = 48 = \frac{48}{180}$
 $20 \mid 9 \times 11 = 99 = \frac{99}{180}$

4.

$$\begin{array}{r}
 7 \text{, } 14 \text{, } 21 \\
 7 \overline{) 7 \ 14 \ 21} \\
 \underline{1 \ 2 \ 3} \\
 7 \times 2 \times 3 = 42 \\
 7 \overline{) 6 \times 4 = 24} \\
 14 \overline{) 3 \times 3 = 9} \\
 21 \overline{) 2 \times 5 = 10} \\
 42, 21, 14 \text{ Ans.}
 \end{array}$$

5.

$$\begin{array}{r}
 19 \text{, } 38 \text{, } 2 \\
 19 \overline{) 19 \ 38 \ 2} \\
 \underline{2 \ 1 \ 2 \ 2} \\
 1 \ 1 \ 1 \\
 19 \times 2 = 38 \\
 19 \overline{) 2 \times 8 = 16} \\
 38 \overline{) 1 \times 5 = 5} \\
 2 \overline{) 19 \times 1 = 19} \\
 19, 19, 19 \text{ Ans.}
 \end{array}$$

6.

$$\begin{array}{r}
 6 \text{, } 12 \text{, } 9 \text{, } 15 \\
 3 \overline{) 6 \ 12 \ 9 \ 15} \\
 2 \overline{) 2 \ 4 \ 3 \ 5} \\
 \underline{1 \ 2 \ 3 \ 5} \\
 3 \times 2 \times 2 \times 3 \times 5 = 180
 \end{array}$$

$$\begin{array}{r}
 180 \\
 6 \overline{) 30 \times 1 = 30} \\
 12 \overline{) 15 \times 5 = 75} \\
 9 \overline{) 20 \times 8 = 160} \\
 15 \overline{) 12 \times 7 = 84} \\
 180, 180, 180, 180 \text{ Ans.}
 \end{array}$$

8.

$$\begin{array}{r}
 4 \text{, } 5 \text{, } 9 \text{, } 11 \\
 4 \times 5 \times 9 \times 11 = 1980 \\
 1980 \\
 4 \overline{) 495 \times 3 = 1485} \\
 5 \overline{) 396 \times 2 = 792} \\
 9 \overline{) 220 \times 4 = 880} \\
 11 \overline{) 180 \times 2 = 360} \\
 1980, 1980, 1980, 1980 \text{ Ans.}
 \end{array}$$

7.

$$\begin{array}{r}
 4 \text{, } 5 \text{, } 6 \text{, } 8 \\
 2 \overline{) 4 \ 5 \ 6 \ 8} \\
 2 \overline{) 2 \ 5 \ 3 \ 4} \\
 \underline{1 \ 5 \ 3 \ 2} \\
 2 \times 2 \times 5 \times 3 \times 2 = 120
 \end{array}$$

$$\begin{array}{r}
 120 \\
 4 \overline{) 30 \times 3 = 90} \\
 5 \overline{) 24 \times 4 = 96} \\
 6 \overline{) 20 \times 5 = 100} \\
 8 \overline{) 15 \times 7 = 105} \\
 120, 120, 120, 120 \text{ Ans.}
 \end{array}$$

9.

$$\begin{array}{r}
 8 \text{, } 10 \text{, } 31 \\
 4 \overline{) 8 \ 10 \ 4} \\
 2 \overline{) 2 \ 10 \ 1} \\
 \underline{1 \ 5 \ 1} \\
 4 \times 2 \times 5 = 40 \\
 40 \\
 8 \overline{) 5 \times 7 = 35} \\
 10 \overline{) 4 \times 9 = 36} \\
 4 \overline{) 10 \times 31 = 310} \\
 40, 40, 40 \text{ Ans.}
 \end{array}$$

10.

$$\begin{array}{r} \frac{3}{7}, \frac{8}{14}, \frac{11}{28}, \frac{22}{7} \\ 7 \overline{) 7 \ 14 \ 28 \ 7} \\ 2 \overline{) 1 \ 2 \ 4 \ 1} \\ \underline{1 \ 1 \ 2 \ 1} \\ 7 \times 2 \times 2 = 28 \end{array}$$

$$\begin{array}{r} 28 \\ 7 \overline{) 4 \times 3 = 12} \\ 14 \overline{) 2 \times 9 = 18} \\ 28 \overline{) 1 \times 11 = 11} \\ 7 \overline{) 4 \times 38 = 152} \\ \frac{13}{28}, \frac{18}{28}, \frac{11}{28}, \frac{152}{28} \text{ Ans.} \end{array}$$

11.

$$\begin{array}{r} \frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}, \frac{6}{12} \\ 2 \overline{) 2 \ 4 \ 6 \ 8 \ 8 \ 12} \\ 3 \overline{) 1 \ 2 \ 3 \ 4 \ 4 \ 6} \\ 2 \overline{) 1 \ 2 \ 1 \ 4 \ 4 \ 2} \\ 2 \overline{) 1 \ 1 \ 1 \ 2 \ 2 \ 1} \\ \underline{1 \ 1 \ 1} \\ 2 \times 3 \times 2 \times 2 = 24 \end{array}$$

$$\begin{array}{r} 24 \\ 2 \overline{) 12 \times 1 = 12} \\ 4 \overline{) 6 \times 3 = 18} \\ 6 \overline{) 4 \times 5 = 20} \\ 8 \overline{) 3 \times 5 = 15} \\ 8 \overline{) 3 \times 7 = 21} \\ 12 \overline{) 2 \times 5 = 10} \end{array}$$

$\frac{12}{24}, \frac{18}{24}, \frac{20}{24}, \frac{15}{24}, \frac{21}{24}, \frac{10}{24}$ Ans. $\frac{12}{24}, \frac{18}{24}, \frac{20}{24}, \frac{15}{24}, \frac{21}{24}, \frac{10}{24}$ Ans.

13.

$$\begin{array}{r} \frac{1}{2}, \frac{4}{8}, \frac{7}{14} \\ 3 \overline{) 6 \ 9 \ 12} \\ 2 \overline{) 2 \ 3 \ 4} \\ \underline{1 \ 3 \ 2} \\ 3 \times 2 \times 3 \times 2 = 36 \end{array}$$

$$\begin{array}{r} 36 \\ 6 \overline{) 6 \times 5 = 30} \\ 9 \overline{) 4 \times 4 = 16} \\ 12 \overline{) 3 \times 7 = 21} \\ \frac{30}{36}, \frac{16}{36}, \frac{21}{36} \text{ Ans.} \end{array}$$

14.

$$\begin{array}{r} 7\frac{1}{2}, 5\frac{6}{11}, 7, 8 = \\ \frac{31}{4}, \frac{11}{4}, \frac{7}{4}, \frac{8}{4} \\ 4 \times 11 = 44 \end{array}$$

$$\begin{array}{r} 44 \\ 4 \overline{) 11 \times 31 = 341} \\ 11 \overline{) 4 \times 61 = 244} \\ 1 \overline{) 44 \times 7 = 308} \\ 1 \overline{) 44 \times 8 = 352} \\ \frac{341}{44}, \frac{244}{44}, \frac{308}{44}, \frac{352}{44} \text{ Ans.} \end{array}$$

15.

$$\frac{3}{4}, 4, 5, 7, 9 = \frac{3}{4}, \frac{4}{4}, \frac{5}{4}, \frac{7}{4}, \frac{9}{4}$$

| | 4 |
|---|-------------------|
| 4 | $1 \times 3 = 3$ |
| 1 | $4 \times 4 = 16$ |
| 1 | $4 \times 5 = 20$ |
| 1 | $4 \times 7 = 28$ |
| 1 | $4 \times 9 = 36$ |

$$\frac{3}{4}, \frac{16}{4}, \frac{20}{4}, \frac{28}{4}, \frac{36}{4} \text{ Ans.}$$

CASE VIII.

8. What part of 3 yards square are 3 square yards? It is evident, that a surface 3 yards square contains 9 square yards, and that 3 square yards are one third of 9 square yards. $\frac{3}{9} = \frac{1}{3}$ Ans.

9. What part of $\frac{1}{8}$ of a solid foot is $\frac{1}{8}$ of a yard solid?

NOTE. In some editions of the Arithmetic, there is an error in the statement of this question.

A solid foot contains 1728 cubic inches, and $\frac{1}{8}$ of 1728 is 216. One sixth of a yard is 6 inches, and a cube whose sides measure 6 inches each contains $6 \times 6 \times 6 = 216$ cubic inches, and 216 is $\frac{1}{8}$ of 1728; thus $\frac{216}{1728} = \frac{1}{8}$ Ans.

CASE IX.

$$5. \frac{3}{4} \times \frac{1}{4} = \frac{3}{16} = \frac{3}{16} \text{ Ans.}$$

$$6. \frac{2}{3} \times \frac{1}{4} \times \frac{2}{3} = \frac{2}{18} = \frac{1}{9} \text{ Ans.}$$

CASE X.

| 7. | | | | 8. | | | |
|-------|-----|-----|---|-------|------|----|----------------|
| gal. | qt. | pt. | | da. | h. | m. | sec. |
| 63 | 0 | 0 | | 365 | 6 | 0 | 0 |
| | | 2 | | | | | 7 |
| <hr/> | | | | <hr/> | | | |
| 7) | 126 | 0 | 0 | 11) | 2556 | 18 | 0 |
| | 18 | 0 | 0 | | 232 | 10 | 21 |
| | | | | | | 49 | $\frac{1}{11}$ |

CASE XI.

6.

$$\begin{aligned} 18 \text{ gal. } 2 \text{ qt.} &= .74 \text{ qt.} \\ 63 \text{ gal.} &= 252 \text{ qt.} = \frac{27}{11} \text{ Ans.} \end{aligned}$$

7.

$$\begin{array}{r} 8 \text{ da. } 17 \text{ h. } 20 \text{ m.} = 12560 \text{ m.} \\ 30 \text{ da.} \quad \quad \quad = 43200 \text{ m.} = 2\frac{11}{16} \text{ Ans.} \end{array}$$

8.

$$\begin{array}{r} 5 \text{ yd. } 2 \text{ qr. } 2 \text{ na.} = 90 \text{ na.} \\ 13 \text{ yd. } 0 \text{ qr. } 2 \text{ na.} = 210 \text{ na.} = \frac{3}{4} \text{ Ans.} \end{array}$$

Section 21. (p. 93.)

CASE II.

2.

$$\begin{array}{r} 4) 8 \quad 12 \quad 16 \\ 2) 2 \quad 3 \quad 4 \\ \hline 1 \quad 3 \quad 2 \end{array}$$

$$4 \times 2 \times 3 \times 2 = 48$$

$$\begin{array}{r} 48 \\ 8 \overline{) 6 \times 5 = 30} \\ 12 \overline{) 4 \times 11 = 44} \\ 16 \overline{) 3 \times 13 = 39} \end{array}$$

$$\frac{113}{48} = 2\frac{11}{48} \text{ Ans.}$$

4.

$$21 \times 37 = 777$$

$$\begin{array}{r} 777 \\ 21 \overline{) 37 \times 19 = 703} \\ 37 \overline{) 21 \times 31 = 651} \\ \hline 1354 \\ 777 \overline{) 1354} = 1\frac{1}{4} \text{ Ans.} \end{array}$$

3.

$$\begin{array}{r} 2) 20 \quad 18 \quad 14 \\ \hline 10 \quad 9 \quad 7 \end{array}$$

$$2 \times 10 \times 9 \times 7 = 1260$$

$$\begin{array}{r} 1260 \\ 20 \overline{) 63 \times 9 = 567} \\ 18 \overline{) 70 \times 11 = 770} \\ 14 \overline{) 90 \times 5 = 450} \end{array}$$

$$\frac{1787}{1260} = 1\frac{527}{1260} \text{ [Ans.]}$$

5.

$$\begin{array}{r} 4) 4 \quad 6 \quad 8 \quad 12 \\ 3) 1 \quad 6 \quad 2 \quad 3 \\ 2) 1 \quad 2 \quad 2 \quad 1 \\ \hline 1 \quad 1 \quad 1 \quad 1 \end{array}$$

$$4 \times 3 \times 2 = 24$$

$$\begin{array}{r} 24 \\ 4 \overline{) 6 \times 3 = 18} \\ 6 \overline{) 4 \times 5 = 20} \\ 8 \overline{) 3 \times 3 = 9} \\ 12 \overline{) 2 \times 1 = 2} \end{array}$$

$$\frac{49}{24} = 2\frac{1}{24} \text{ Ans.}$$

6.

$$\begin{array}{r} 3) 9 \quad 21 \quad 24 \quad 2 \\ 2) 3 \quad 7 \quad 8 \quad 2 \\ \hline 3 \quad 7 \quad 4 \quad 1 \end{array}$$

$$3 \times 2 \times 3 \times 7 \times 4 = 504$$

$$\begin{array}{r} 504 \\ 9 \overline{) 56 \times 4 = 224} \\ 21 \overline{) 24 \times 8 = 192} \\ 24 \overline{) 21 \times 11 = 231} \\ 2 \overline{) 252 \times 1 = 252} \\ \hline 899 \\ 504 \overline{) 899} = 1 \frac{395}{504} \text{ Ans.} \end{array}$$

7.

$$\begin{array}{r} 12) 72 \quad 84 \quad 96 \\ 2) 6 \quad 7 \quad 8 \\ \hline 3 \quad 7 \quad 4 \end{array}$$

$$12 \times 2 \times 3 \times 7 \times 4 = 2016$$

$$\begin{array}{r} 2016 \\ 72 \overline{) 28 \times 19 = 532} \\ 84 \overline{) 24 \times 51 = 1224} \\ 96 \overline{) 21 \times 71 = 1491} \\ \hline 3247 \\ 2016 \overline{) 3247} = 1 \frac{1231}{2016} \text{ [Ans.]} \end{array}$$

8.

$$\begin{array}{r} 25) 25 \quad 50 \quad 75 \quad 100 \\ 2) 1 \quad 2 \quad 3 \quad 4 \\ \hline 1 \quad 1 \quad 3 \quad 2 \end{array}$$

$$25 \times 2 \times 3 \times 2 = 300$$

$$\begin{array}{r} 300 \\ 25 \overline{) 12 \times 3 = 36} \\ 50 \overline{) 6 \times 49 = 294} \\ 75 \overline{) 4 \times 74 = 296} \\ 100 \overline{) 3 \times 81 = 243} \\ \hline 869 \\ 300 \overline{) 869} = 2 \frac{269}{300} \text{ [Ans.]} \end{array}$$

9.

$$\begin{array}{r} 2) 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \\ 2) 1 \quad 3 \quad 2 \quad 5 \quad 3 \quad 7 \quad 4 \\ 3) 1 \quad 3 \quad 1 \quad 5 \quad 3 \quad 7 \quad 2 \\ \hline 1 \quad 1 \quad 1 \quad 5 \quad 1 \quad 7 \quad 2 \end{array}$$

$$2 \times 2 \times 3 \times 5 \times 7 \times 2 = 840$$

$$\begin{array}{r} 840 \\ 2 \overline{) 420 \times 1 = 420} \\ 3 \overline{) 280 \times 2 = 560} \\ 4 \overline{) 210 \times 3 = 630} \\ 5 \overline{) 168 \times 4 = 672} \\ 6 \overline{) 140 \times 5 = 700} \\ 7 \overline{) 120 \times 6 = 720} \\ 8 \overline{) 105 \times 7 = 735} \\ \hline 4437 \\ 840 \overline{) 4437} = 5 \frac{737}{840} \text{ Ans.} \end{array}$$

10.

$$\begin{array}{r} 3) 9 \ 10 \ 11 \ 12 \ 13 \ 14 \ 15 \\ 2) 3 \ 10 \ 11 \ 4 \ 13 \ 14 \ 5 \\ 5) 3 \ 5 \ 11 \ 2 \ 13 \ 7 \ 5 \\ \hline 3 \ 1 \ 11 \ 2 \ 13 \ 7 \ 1 \end{array}$$

$$3 \times 2 \times 5 \times 3 \times 11 \times 2 \times 13 \times 7 = 180180$$

$$\begin{array}{l} 180180 \\ 9 \overline{) 20020 \times 8 = 160160} \\ 10 \overline{) 18018 \times 9 = 162162} \\ 11 \overline{) 16380 \times 10 = 163800} \\ 12 \overline{) 15015 \times 11 = 165165} \\ 13 \overline{) 13860 \times 12 = 166320} \\ 14 \overline{) 12870 \times 13 = 167310} \\ 15 \overline{) 12012 \times 14 = 168168} \end{array}$$

$$\frac{1158085}{180180} = 6\frac{111}{180} \text{ Ans.}$$

11.

$$\frac{2}{3} \times \frac{3}{4} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{5}{8} \times \frac{7}{8} = \frac{35}{64}$$

$$\begin{array}{r} 2) 2 \ 48 \\ \hline 1 \ 24 \end{array}$$

$$2 \times 24 = 48$$

$$\begin{array}{r} 48 \\ 2 \overline{) 24 \times 1 = 24} \\ 48 \overline{) 1 \times 35 = 35} \\ \hline 59 \\ 48 \overline{) 59} = 1\frac{11}{48} \end{array} \text{ [Ans.]}$$

12.

$$\frac{2}{3} \times \frac{3}{4} = \frac{2}{4}$$

$$\frac{11}{12} \times \frac{1}{2} = \frac{11}{24}$$

$$\begin{array}{r} 8) 32 \ 24 \\ \hline 4 \ 3 \end{array}$$

$$8 \times 4 \times 3 = 96$$

$$\begin{array}{l} 96 \\ 32 \overline{) 3 \times 21 = 63} \\ 24 \overline{) 4 \times 11 = 44} \\ \hline 107 \\ 96 \overline{) 107} = 1\frac{11}{96} \text{ Ans.} \end{array}$$

13.

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$

$$\frac{1}{2} \times \frac{7}{10} = \frac{7}{20}$$

$$27 \times 50 = 1350$$

$$\begin{array}{l} 1350 \\ 27 \overline{) 50 \times 2 = 100} \\ 50 \overline{) 27 \times 7 = 189} \\ \hline 289 \\ 1350 \overline{) 289} \text{ Ans.} \end{array}$$

14.

$$\frac{2}{3} \times \frac{3}{4} \times \frac{4}{5} = \frac{2}{5}$$

$$\frac{5}{6} \times \frac{6}{7} \times \frac{7}{10} = \frac{5}{10} = \frac{1}{2}$$

$$2 \times 5 = 10$$

$$\begin{array}{r|l} 10 & \\ 5 & 2 \times 2 = 4 \\ 2 & 5 \times 1 = 5 \\ & \hline & 9 \\ & 10 \text{ Ans.} \end{array}$$

16.

$$3\frac{3}{4} = 3\frac{1}{2} \quad 4\frac{1}{4} = 4\frac{1}{2}$$

$$\begin{array}{r|l} & 7 \quad 14 \\ 7 & \\ & \hline & 1 \quad 2 \end{array}$$

$$7 \times 2 = 14$$

$$\begin{array}{r|l} 14 & \\ 7 & 2 \times 24 = 48 \\ 14 & 1 \times 67 = 67 \\ & \hline & 115 \\ & 14 = 8\frac{3}{14} \text{ Ans.} \end{array}$$

15.

$$\frac{1}{3} \times \frac{3}{11} \times \frac{11}{12} = \frac{1}{12}$$

$$\frac{1}{2} \times \frac{2}{9} = \frac{1}{9}$$

$$\begin{array}{r} 3 \overline{) 12 \quad 9} \\ \underline{4 \quad 3} \end{array}$$

$$3 \times 4 \times 3 = 36$$

$$\begin{array}{r|l} 36 & \\ 12 & 3 \times 1 = 3 \\ 9 & 4 \times 1 = 4 \\ & \hline & 7 \\ & 36 \text{ Ans.} \end{array}$$

17.

$$4\frac{1}{2} = 4\frac{1}{2} \quad 5\frac{1}{2} = 5\frac{1}{2}$$

$$4 \times 7 = 28$$

$$\begin{array}{r|l} 28 & \\ 4 & 7 \times 19 = 133 \\ 7 & 4 \times 41 = 164 \\ & \hline & 297 \\ & 28 = 10\frac{17}{28} \text{ [Ans.]} \end{array}$$

18.

$$17\frac{1}{2} = 17\frac{1}{2} \quad 18\frac{1}{2} = 18\frac{1}{2}$$

$$\begin{array}{r|l} & 4 \quad 12 \\ 4 & \\ & \hline & 1 \quad 3 \end{array}$$

$$4 \times 3 = 12$$

$$\begin{array}{r|l} 12 & \\ 4 & 3 \times 71 = 213 \\ 12 & 1 \times 221 = 221 \\ & \hline & 434 \\ & 12 = 36\frac{1}{3} \text{ Ans.} \end{array}$$

Section 22. (p. 95.)

SUBTRACTION OF VULGAR FRACTIONS.

12.

$$\begin{array}{r} \frac{7}{18} - \frac{4}{21} \\ 3) 18 \quad 21 \\ \underline{6 \quad 7} \\ 3 \times 6 \times 7 = 126 \\ 18 \overline{) 126} \\ 7 \times 7 = 49 \\ 21 \overline{) 126} \\ 6 \times 4 = 24 \\ \underline{25} \\ 126 \text{ Ans.} \end{array}$$

13.

$$\begin{array}{r} \frac{13}{20} - \frac{11}{16} \\ 4) 20 \quad 16 \\ \underline{5 \quad 4} \\ 4 \times 5 \times 4 = 80 \\ 20 \overline{) 80} \\ 4 \times 19 = 76 \\ 16 \overline{) 80} \\ 5 \times 11 = 55 \\ \underline{21} \\ 80 \text{ Ans.} \end{array}$$

14.

$$\begin{array}{r} \frac{11}{24} - \frac{7}{20} \\ 4) 24 \quad 20 \\ \underline{6 \quad 5} \\ 4 \times 6 \times 5 = 120 \\ 24 \overline{) 120} \\ 5 \times 17 = 85 \\ 20 \overline{) 120} \\ 6 \times 7 = 42 \\ \underline{43} \\ 120 \text{ Ans.} \end{array}$$

15.

$$\begin{array}{r} \frac{11}{34} - \frac{17}{10} \\ 2) 34 \quad 10 \\ \underline{17 \quad 5} \\ 2 \times 17 \times 5 = 170 \\ 34 \overline{) 170} \\ 5 \times 11 = 55 \\ 10 \overline{) 170} \\ 17 \times 1 = 17 \\ \underline{38} \\ 170 = \frac{11}{10} \text{ Ans.} \end{array}$$

16.

$$\begin{array}{r} \frac{31}{36} - \frac{9}{16} \\ 4) 36 \quad 16 \\ \underline{9 \quad 4} \\ 4 \times 9 \times 4 = 144 \\ 36 \overline{) 144} \\ 4 \times 31 = 124 \\ 16 \overline{) 144} \\ 9 \times 9 = 81 \\ \underline{43} \\ 144 \text{ Ans.} \end{array}$$

17.

$$\frac{11}{11} - \frac{1}{11}$$

$$37 \times 11 = 407$$

$$\begin{array}{r|l} 407 & \\ 37 & 11 \times 18 = 198 \\ 11 & 37 \times 3 = 111 \\ & \hline & 87 \\ & 407 \text{ Ans.} \end{array}$$

18.

$$\frac{111}{111} - \frac{1}{11}$$

$$200 \times 19 = 3800$$

$$\begin{array}{r|l} 3800 & \\ 200 & 19 \times 111 = 2109 \\ 19 & 200 \times 1 = 200 \\ & \hline & 1909 \\ & 3800 \text{ Ans.} \end{array}$$

19.

$$\frac{1}{10} - \frac{1}{1000}$$

$$\begin{array}{r} 10 \overline{) 10} \quad 1000 \\ \underline{1} \quad 100 \end{array}$$

$$10 \times 100 = 1000$$

$$\begin{array}{r|l} 1000 & \\ 10 & 100 \times 1 = 100 \\ 1000 & 1 \times 1 = 1 \\ & \hline & 99 \\ & 1000 \text{ Ans.} \end{array}$$

20.

$$\frac{2}{3} \times \frac{2}{11} = \frac{4}{33} = \frac{2}{11} \quad \frac{1}{4} \times \frac{2}{3} = \frac{2}{12} = \frac{1}{6}$$

$$\frac{2}{11} - \frac{1}{11}$$

$$11 \times 14 = 154$$

$$\begin{array}{r|l} 154 & \\ 11 & 14 \times 6 = 84 \\ 14 & 11 \times 1 = 11 \\ & \hline & 73 \\ & 154 \text{ Ans.} \end{array}$$

21.

$$\frac{1}{9} \times \frac{9}{10} = \frac{1}{10} \quad \frac{1}{12} \times \frac{12}{13} = \frac{1}{13}$$

$$\frac{1}{10} - \frac{1}{13}$$

$$10 \times 13 = 130$$

$$\begin{array}{r|l} 130 & \\ 10 & 13 \\ 13 & 10 \\ & \hline & 3 \\ & 130 \text{ Ans.} \end{array}$$

22.

$$7\frac{1}{2} = \frac{15}{2} \quad 3\frac{1}{3} = \frac{10}{3}$$

$$4 \times 9 = 36$$

$$\begin{array}{r|l} 36 & \\ 4 & 9 \times 29 = 261 \\ 9 & 4 \times 34 = 136 \\ & \hline & 125 \\ & 36 = 3\frac{1}{3} \text{ [Ans.]} \end{array}$$

23.

$$8\frac{3}{7} = \frac{58}{7} \quad 5\frac{1}{6} = \frac{31}{6}$$

$$7 \times 5 = 35$$

$$\begin{array}{r} 35 \\ 7 \overline{) 5 \times 59 = 295} \\ 5 \overline{) 7 \times 29 = 203} \\ \hline 92 \\ 35 \overline{) 92} = 2\frac{22}{35} \text{ Ans.} \end{array}$$

24.

$$9\frac{1}{4} = \frac{37}{4} \quad 3\frac{1}{8} = \frac{25}{8}$$

$$\begin{array}{r} 37 \\ 4 \overline{) 48} \\ \hline 12 \\ 4 \times 2 = 8 \end{array}$$

$$\begin{array}{r} 8 \\ 4 \overline{) 2 \times 37 = 74} \\ 8 \overline{) 1 \times 31 = 31} \\ \hline 43 \\ 8 \overline{) 43} = 5\frac{3}{8} \text{ [Ans.]} \end{array}$$

25.

$$10\frac{3}{4} = \frac{43}{4} \quad 10\frac{1}{19} = \frac{191}{19}$$

$$\frac{43}{4} - \frac{191}{19}$$

$$4 \times 19 = 76$$

$$\begin{array}{r} 76 \\ 4 \overline{) 19 \times 43 = 817} \\ 19 \overline{) 4 \times 191 = 764} \\ \hline 53 \\ 76 \overline{) 53} \text{ Ans.} \end{array}$$

NOTE. In the following questions, the new numerator is found by multiplying each numerator by the denominator of the other fraction; and the common denominator is obtained by multiplying together the two denominators. See Arithmetic, page 96, question 32.

33.

$$\begin{array}{r} 12\frac{3}{4} = 12\frac{6}{8} \\ 9\frac{1}{2} = 9\frac{4}{8} \\ \hline 21\frac{10}{8} \text{ Ans.} \end{array}$$

34.

$$\begin{array}{r} 16\frac{3}{11} = 16\frac{33}{11} \\ 5\frac{2}{11} = 5\frac{22}{11} \\ \hline 10\frac{55}{11} \text{ Ans.} \end{array}$$

35.

$$\begin{array}{r} 19\frac{3}{5} = 19\frac{24}{20} \\ 15\frac{2}{5} = 15\frac{16}{20} \\ \hline 34\frac{40}{20} \text{ Ans.} \end{array}$$

36.

$$\begin{array}{r} 97\frac{1}{4} = 97\frac{11}{44} \\ 18\frac{3}{11} = 18\frac{12}{44} \\ \hline 78\frac{23}{44} \text{ Ans.} \end{array}$$

37.

$$\begin{array}{r} 87\frac{11}{13} = 87\frac{44}{52} \\ 19\frac{2}{13} = 19\frac{8}{52} \\ \hline 67\frac{52}{52} \text{ Ans.} \end{array}$$

38.

$$\begin{array}{r} 19\frac{1}{8} = 19\frac{11}{88} \\ 7\frac{1}{11} = 7\frac{8}{88} \\ \hline 11\frac{19}{88} \text{ Ans.} \end{array}$$

39.

$$\begin{array}{r} 15\frac{1}{2} = 15\frac{4}{8} \\ 8\frac{1}{4} = 8\frac{2}{8} \\ \hline 6\frac{6}{8} \text{ Ans.} \end{array}$$

40.

$$\begin{array}{r} 9\frac{1}{3} = 9\frac{12}{36} \\ 31\frac{2}{3} = 31\frac{24}{36} \\ \hline 5\frac{36}{36} \text{ Ans.} \end{array}$$

41.

$$\begin{array}{r} 71\frac{1}{15} = 71\frac{12}{180} \\ 13\frac{1}{12} = 13\frac{15}{180} \\ \hline 57\frac{27}{180} \text{ Ans.} \end{array}$$

NOTE. The answer to question 42 must be an infinite quantity ; for the 11 in the numerator will contain the zero in the denominator an infinite number of times.

43.

$$\begin{array}{r} 63 \\ 12\frac{3}{4} \\ \hline 50\frac{1}{4} \text{ Ans.} \end{array}$$

44.

$$\begin{array}{r} 2\frac{1}{2} = 2\frac{1}{2} \\ 3\frac{1}{2} = 3\frac{1}{2} \\ 1\frac{1}{2} = 1\frac{1}{2} \\ \hline 6\frac{1}{2} \end{array}$$

$$\begin{array}{r} 10 \\ 6\frac{7}{8} \\ \hline 3\frac{1}{8} \text{ Ans.} \end{array}$$

Section 23. (p. 98.)

MULTIPLICATION OF VULGAR FRACTIONS.

3.

$$\begin{array}{r} 21 \\ 3 \\ \hline 8)63 \\ \hline \text{Ans. } 7\frac{1}{2} \end{array}$$

4.

$$\begin{array}{r} 56 \\ 3 \\ \hline 4)168 \\ \hline \text{Ans. } 42 \end{array}$$

5.

$$\begin{array}{r} 396 \\ 9 \\ \hline 11)3564 \\ \hline \text{Ans. } \$3.24 \end{array}$$

6.

$$\begin{array}{r} 79 \\ 7 \\ \hline 8)553 \\ \hline \text{Ans. } \$69\frac{1}{8} \end{array}$$

7.

$$\begin{array}{r} 376 \\ 11 \\ \hline 17)4136 \\ \hline \text{Ans. } 243\frac{5}{17} \end{array}$$

8.

$$\begin{array}{r} 189 \\ 15 \\ \hline 17)2835 \\ \hline \text{Ans. } 166\frac{1}{3} \end{array}$$

9.

$$\begin{array}{r} 471 \\ 2 \\ \hline 117)942 \\ \hline \text{Ans. } 8\frac{2}{9} \end{array}$$

10.

$$\begin{array}{r} 871 \\ 1 \\ \hline 37)871 \\ \hline \text{Ans. } 23\frac{3}{7} \end{array}$$

11.

$$\begin{array}{r} 365 \\ 113 \\ \hline 117)41245 \\ \hline \text{Ans. } 352\frac{81}{117} \end{array}$$

12.

$$\begin{array}{r} 867 \\ 1 \\ \hline 136)867 \\ \hline \text{Ans. } 6\frac{1}{136} \end{array}$$

14.

$$\begin{array}{r} 9\frac{3}{5} \quad 3 \\ 5 \quad 5 \\ \hline 45 \quad 8)15 \\ \hline 1\frac{1}{5} \quad 1\frac{1}{5} \\ \hline \text{Ans. } 40\frac{1}{5} \end{array}$$

15.

$$\begin{array}{r} 12\frac{3}{4} \quad 3 \\ 7 \quad 7 \\ \hline 84 \quad 5) 21 \\ 4\frac{1}{2} \quad 4\frac{1}{2} \\ \hline 88\frac{1}{2} \text{ Ans.} \end{array}$$

16.

$$\begin{array}{r} 8\frac{1}{2} \quad 11 \\ 9 \quad 9 \\ \hline 72 \quad 12) 99 \\ 8\frac{1}{2} \quad 8\frac{1}{2} \\ \hline 80\frac{1}{2} \text{ Ans.} \end{array}$$

17.

$$\begin{array}{r} 7\frac{1}{2} \quad 1 \\ 10 \quad 10 \\ \hline 70 \quad 9) 10 \\ 1\frac{1}{2} \quad 1\frac{1}{2} \\ \hline 71\frac{1}{2} \text{ Ans.} \end{array}$$

18.

$$\begin{array}{r} 11\frac{1}{2} \quad 6 \\ 8 \quad 8 \\ \hline 88 \quad 7) 48 \\ 6\frac{1}{2} \quad 6\frac{1}{2} \\ \hline 94\frac{1}{2} \text{ Ans.} \end{array}$$

19.

$$\begin{array}{r} 7\frac{1}{11} \quad 6 \\ 5 \quad 5 \\ \hline 35 \quad 11) 30 \\ 2\frac{1}{11} \quad 2\frac{1}{11} \\ \hline \$37\frac{1}{11} \text{ Ans.} \end{array}$$

20.

$$\begin{array}{r} 23\frac{7}{11} \quad 7 \\ 6 \quad 6 \\ \hline 138 \quad 12) 42 \\ 3\frac{1}{2} \quad 3\frac{1}{2} \\ \hline \$141\frac{1}{2} \text{ Ans.} \end{array}$$

21.

$$\begin{array}{r} 8\frac{3}{5} \quad 3 \\ 5 \quad 5 \\ \hline 40 \quad 8) 15 \\ 1\frac{3}{5} \quad 1\frac{3}{5} \\ \hline \$41\frac{3}{5} \text{ Ans.} \end{array}$$

22.

$$\begin{array}{r} \$6\frac{3}{5} \quad 3 \\ 9 \quad 9 \\ \hline 54 \quad 8) 27 \\ 3\frac{3}{5} \quad 3\frac{3}{5} \\ \hline \$57\frac{3}{5} \text{ Ans.} \end{array}$$

23.

$$\begin{array}{r} \$6.37\frac{1}{2} \quad 1 \\ 12 \quad 12 \\ \hline 76.44 \quad 2) 12 \\ 6 \quad 6 \\ \hline \$76.50 \text{ Ans.} \end{array}$$

24.

$$\begin{array}{r} \$9\frac{3}{4} \quad 3 \\ 11 \quad 11 \\ \hline 99 \quad 8) 33 \\ 4\frac{1}{2} \quad 4\frac{1}{2} \\ \hline \$103\frac{1}{4} \text{ Ans.} \end{array}$$

25.

$$\begin{array}{r} 4\frac{3}{5} \quad 3 \\ \$1.75 \quad \$1.75 \\ \hline 7.00 \quad 8) 525 \\ .65\frac{1}{2} \quad .65\frac{1}{2} \\ \hline \$7.65\frac{1}{2} \text{ Ans.} \end{array}$$

26.

$$\begin{array}{r} \$11\frac{1}{2} \quad .7 \\ 7 \quad 7 \\ \hline 77 \quad 8) 49 \\ 6\frac{1}{2} \quad 6\frac{1}{2} \\ \hline \$83\frac{1}{2} \text{ Ans.} \end{array}$$

27.

$$\begin{array}{r} \$10\frac{1}{2} \quad 5 \\ 9 \quad 9 \\ \hline 90 \quad 8) 45 \\ 5\frac{1}{2} \quad 5\frac{1}{2} \\ \hline \$95\frac{1}{2} \text{ Ans.} \end{array}$$

28.

$$\begin{array}{r} \$3\frac{1}{5} \quad 1 \\ 5 \quad 5 \\ \hline 15 \quad 5 \\ 0\frac{1}{5} \quad \frac{1}{5} \\ \hline \$15\frac{1}{5} \text{ Ans.} \end{array}$$

29.

$$\begin{array}{r} \$7.62\frac{1}{2} \quad 1 \\ 15 \quad 15 \\ \hline 114.30 \quad 2) 15 \\ 7\frac{1}{2} \quad 7\frac{1}{2} \\ \hline \$114.37\frac{1}{2} \text{ Ans.} \end{array}$$

30.

$$\begin{array}{r}
 \$8.37\frac{1}{2} \quad 1 \\
 \underline{40} \quad \underline{40} \\
 334.80 \quad 2)40 \\
 \underline{20} \quad \underline{20} \\
 \$335.00 \text{ Ans.}
 \end{array}$$

33.

$$\frac{5}{11} \times \frac{11}{20} = \frac{5}{20} = \frac{1}{4} \text{ Ans.}$$

34.

$$\frac{8}{12} \times \frac{12}{24} = \frac{8}{24} = \frac{1}{3} \text{ Ans.}$$

35.

$$\frac{18}{19} \times \frac{19}{90} = \frac{18}{90} = \frac{1}{5} \text{ Ans.}$$

36.

$$\frac{15}{17} \times \frac{17}{60} = \frac{15}{60} = \frac{1}{4} \text{ Ans.}$$

37.

$$\frac{1}{9} \times \frac{8}{17} = \frac{8}{153} \text{ Ans.}$$

38.

$$\frac{6}{22} \times \frac{22}{36} = \frac{6}{36} = \frac{1}{6} \text{ Ans.}$$

39.

$$\frac{7}{8} \times \frac{8}{9} = \frac{7}{9} \text{ Ans.}$$

40.

$$\frac{8}{11} \times \frac{11}{32} = \frac{8}{32} = \frac{1}{4} \text{ Ans.}$$

41.

$$\frac{7}{10} \times \frac{3}{4} = \frac{21}{40} \text{ Ans.}$$

$$43. 7\frac{1}{2} \times 6\frac{2}{3} = \frac{57}{2} \times \frac{52}{3} = \frac{2364}{6} = 60\frac{2}{3} \text{ Ans.}$$

$$44. 4\frac{7}{8} \times 9\frac{1}{4} = \frac{39}{2} \times \frac{37}{4} = \frac{1443}{8} = 45\frac{3}{8} \text{ Ans.}$$

$$45. 11\frac{2}{3} \times 8\frac{4}{5} = \frac{79}{3} \times \frac{44}{5} = \frac{3476}{15} = 99\frac{11}{15} \text{ Ans.}$$

$$46. 12\frac{2}{3} \times 11\frac{1}{2} = \frac{54}{1} \times \frac{19}{4} = \frac{1026}{4} = 147\frac{1}{2} \text{ Ans.}$$

$$47. 7\frac{3}{4} \times 5\frac{2}{3} = \frac{31}{4} \times \frac{16}{3} = 81\frac{1}{3} \text{ Ans.}$$

$$48. 7\frac{3}{8} \times 3\frac{1}{2} = \frac{59}{2} \times \frac{7}{2} = \frac{413}{2} = 206\frac{1}{2} \text{ Ans.}$$

$$49. 6\frac{2}{3} \times 23\frac{1}{2} = \frac{41}{3} \times \frac{47}{2} = \frac{1927}{6} = 321\frac{1}{6} \text{ Ans.}$$

$$50. 3\frac{1}{2} \times 9\frac{1}{2} = \frac{7}{2} \times \frac{19}{2} = \frac{133}{2} = 66\frac{1}{2} \text{ miles, Ans.}$$

$$51. 361\frac{1}{10} \times 25\frac{1}{2} = \frac{7221}{20} \times \frac{51}{2} = \frac{368271}{40} = 9206\frac{31}{40} \text{ Ans.}$$

52. $\frac{2}{3} \times \frac{3}{8} = \frac{2}{8} = \frac{1}{4}$; $\frac{7}{9} \times \frac{9}{11} = \frac{7}{11}$; $\frac{1}{4} \times \frac{7}{11} = \frac{7}{44}$ of a dollar, Ans.

53. $97\frac{5}{8} \times 49\frac{1}{2} = 15\frac{5}{8} \times 24\frac{1}{2} = 112\frac{22}{2} = 4810\frac{1}{8}$ rods, Ans.

54. $\frac{3}{9} \times \frac{4}{7} \times \frac{9}{11} = \frac{4}{7}$; $\frac{2}{3} \times \frac{1}{2} = \frac{2}{6} = \frac{1}{3}$; $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$; $\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$ acres, Ans.

55. $76\frac{7}{5} = 150\frac{7}{5}$; $18\frac{3}{4} = 7\frac{5}{4}$; $120\frac{7}{5} \times 7\frac{5}{4} = 1430\frac{25}{4} = 1430\frac{1}{4}$ p. = 8A. 3R. 30 $\frac{1}{4}$ p. Ans.

56. $7\frac{3}{4} = 3\frac{1}{2}$; $1\frac{3}{4} = \frac{7}{4}$; $1\frac{1}{2} = \frac{3}{2}$; $3\frac{1}{2} \times \frac{7}{4} \times \frac{3}{2} \times \frac{1}{2} = 10\frac{21}{8}$ = 169 $\frac{1}{2}$ cubic feet, Ans.

57. $\frac{1}{11}$ of an acre = 2R. 21p. 222 $\frac{1}{2}$ ft. From this we subtract 20p. 200ft. and there remain 2R. 1p. 22 $\frac{1}{2}$ ft. Ans.

58. $\frac{1}{3} \times 160 \times 1.75 = 30\frac{8}{3} = \$236.92\frac{2}{3}$ Ans.

59. $15\frac{3}{4} = \frac{63}{4}$; $\frac{1}{3} \times 20 \times \frac{63}{4} = 31\frac{5}{2} = \$49.73\frac{1}{2}$ Ans.

60. $14\frac{2}{3} = \frac{44}{3}$; $11\frac{2}{3} = \frac{35}{3}$; $5\frac{2}{3} = \frac{17}{3}$; $10\frac{1}{2} = \frac{21}{2}$; $\frac{44}{3} \times \frac{35}{3} \times \frac{17}{3} \times \frac{21}{2} = 1157\frac{1840}{3} = 9184$ Ans.

61. $7 - \frac{4}{7} = \frac{45}{7}$; $\frac{1}{2} \times \frac{45}{7} = \frac{45}{14} = \frac{3}{1}$; $1\frac{1}{2} \times \frac{3}{1} = 1\frac{1}{2} = \frac{3}{2}$; $12\frac{1}{2} = \frac{25}{2}$; $\frac{25}{2} \times \frac{3}{2} = 14\frac{3}{4} = \3.57 Ans.

62. $19\frac{3}{4} = 17\frac{5}{8}$; $7\frac{3}{8} = \frac{59}{8}$; $17\frac{5}{8} \times \frac{59}{8} = 20\frac{34}{8} = \$143\frac{1}{2}$ Ans.

63. $13\frac{2}{11} = \frac{152}{11}$; $3\frac{1}{2} = \frac{7}{2}$; $\frac{152}{11} \times \frac{7}{2} = 24\frac{28}{11} = \$51\frac{2}{11}$ Ans.

64. $7\frac{7}{10} = 7\frac{7}{10}$; $9\frac{1}{2} = 9\frac{1}{2}$; $7\frac{7}{10} + 9\frac{1}{2} = 17\frac{17}{10} = 18\frac{7}{10}$; $78\frac{3}{8} = 62\frac{7}{8}$; $18\frac{7}{10} \times 62\frac{7}{8} = 6627\frac{32}{80} = \$1380.70\frac{1}{2}$ Ans.

65. $175\frac{3}{8} = 175\frac{3}{8}$; $\frac{5}{8} - \frac{3}{8} = \frac{2}{8} = \frac{1}{4}$; $175\frac{3}{8} \times \frac{1}{4} = 17\frac{3}{8}$; $8\frac{1}{2} = \frac{17}{2}$; $17\frac{3}{8} \times \frac{17}{2} = 146\frac{9}{8} = \$2.04\frac{1}{8}$ Ans.

66. $475 \div 3 = 158\frac{1}{3}$; $158\frac{1}{3} \times .08 = \$12.66\frac{2}{3}$; $475 - 158\frac{1}{3} = 316\frac{2}{3}$; $\frac{2}{3} \times 316\frac{2}{3} = 211\frac{1}{3}$; $211\frac{1}{3} \times .10 = \$21.11\frac{1}{3}$; $316\frac{2}{3} - 211\frac{1}{3} = 105\frac{1}{3}$; $105\frac{1}{3} \times .12\frac{1}{2} = \$13.19\frac{1}{3}$ Ans.

$\$21.11\frac{1}{3} + \$12.66\frac{2}{3} + \$13.19\frac{1}{3} = \$46.97\frac{2}{3}$; $\$46.97\frac{2}{3} - \$30.00 = \$16.97\frac{2}{3}$ Green's bargain, Ans.

67. $14\frac{3}{4} = 14\frac{3}{4}$; $\frac{14}{101} \times \frac{101}{7} = 2 = \2.00 Ans.

68. $234 = 19\frac{1}{2}$; $16\frac{1}{2} = 3\frac{1}{2}$; $19\frac{1}{2} \times 3\frac{1}{2} = 544\frac{1}{2} = 388\frac{1}{2}\text{ft.}$;
 $134 = 2\frac{1}{2}$; $2\frac{1}{2} \times 3\frac{1}{2} = 21\frac{1}{2} = 223\frac{1}{2}\text{ft.}$; $7\frac{1}{2} \times 2 = 14\frac{1}{2}$;
 $388\frac{1}{2} - 14\frac{1}{2} = 374\frac{1}{2} = 74\frac{1}{2}$; $223\frac{1}{2} - 14\frac{1}{2} = 209\frac{1}{2}$;
 $= 43\frac{1}{2}$; $74\frac{1}{2} \times 43\frac{1}{2} = 3242\frac{1}{2} = 78221\frac{1}{2}\text{ square}$
 $\text{feet} = 1\text{A. } 3\text{R. } 7\text{p. } 851\frac{1}{2}\text{ft. Ans.}$

69. If $\frac{2}{3}$ of this field be planted with corn, $\frac{1}{3}$ of the field will remain unplanted. And if $\frac{2}{3}$ of this remainder be sown with wheat, then there will remain $\frac{1}{3}$ of the whole field; because, if $\frac{2}{3}$ of $\frac{1}{3} = \frac{2}{9}$ be taken from $\frac{1}{3}$, the remainder will be $\frac{1}{9}$; thus, $\frac{1}{3} = \frac{3}{9} - \frac{2}{9} = \frac{1}{9}$. If, then, $\frac{2}{3}$ of this $\frac{1}{9}$ be planted with potatoes, $\frac{1}{9}$ of the $\frac{1}{9}$ will remain; and $\frac{1}{9}$ of $\frac{1}{9}$ is $\frac{1}{81}$. That is, the 3 rods square and the 3 square rods are $\frac{1}{81}$ of the whole field; but 3 rods square are 9 square rods; and if to these we add the 3 square rods, the whole amount will be 12 square rods. If, then, 12 square rods be $\frac{1}{81}$ of the field, 3 square rods will be $\frac{1}{27}$ of the field; and, if $\frac{1}{27}$ of the field be 3 rods, $\frac{81}{27}$, or the whole field, will be 63 times as much, that is, $63 \times 3 = 189$ square rods = 1A. 0R. 29p. Ans.

70. $\frac{7}{8} \times \frac{8}{11} \times \frac{11}{14} \times \frac{5}{17} \times \frac{17}{19} \times \frac{19}{25} = \frac{35}{25} = \frac{7}{5}$ Ans.

Section 24. (p. 103.)

DIVISION OF VULGAR FRACTIONS.

2. $\frac{7}{11} \times \frac{1}{12} = \frac{7}{132}$ Ans.

3. $\frac{11}{12} \times \frac{1}{8} = \frac{11}{96}$ Ans.

4. $\frac{7}{8} \times \frac{1}{12} = \frac{7}{96}$ Ans.

5. $\frac{5}{7} \times \frac{1}{5} = \frac{1}{7}$ Ans.

6. $\frac{2}{3} \times \frac{1}{6} = \frac{2}{18} = \frac{1}{9}$ Ans.

7. $\frac{1}{7} \times \frac{1}{8} = \frac{1}{56} = \frac{1}{56}$ Ans.

$$8. \frac{3}{4} \times 10000 = \$2857\frac{1}{4}; 10000 - 2857\frac{1}{4} = 7142\frac{3}{4}; \frac{3}{4} \times 7142\frac{3}{4} = 2380\frac{3}{4}; 7142\frac{3}{4} - 2380\frac{3}{4} = 4761\frac{1}{4}; 4761\frac{1}{4} \div 7 = \$680\frac{10}{147} \text{ Ans.}$$

$$10. 18 \times 8 = 144; 144 \div 7 = 20\frac{4}{7} \text{ Ans.}$$

$$11. 27 \times 12 = 324; 324 \div 11 = 29\frac{5}{11} \text{ Ans.}$$

$$12. 23 \times 4 = 92; 92 \div 1 = 92 \text{ Ans.}$$

$$13. 5 \times 5 = 25; 25 \div 1 = 25 \text{ Ans.}$$

$$14. 12 \times 4 = 48; 48 \div 3 = 16 \text{ Ans.}$$

$$15. 16 \times 2 = 32; 32 \div 1 = 32 \text{ Ans.}$$

$$16. 100 \times 19 = 1900; 1900 \div 17 = 111\frac{13}{17} \text{ Ans.}$$

$$17. 50 \times 5 = 250; 250 \div 3 = 83\frac{1}{3} \text{ Ans.}$$

$$18. 60 \times 11 = 660; 660 \div 9 = 73\frac{1}{3} \text{ min. Ans.}$$

$$20. 17\frac{3}{4} \div 7 = 2\frac{1}{4} \text{ Ans.}$$

$$21. 18\frac{3}{4} \div 8 = 2\frac{1}{8} \text{ Ans.}$$

$$22. 27\frac{1}{2} \div 9 = 3\frac{1}{18} \text{ Ans.}$$

$$23. 31\frac{1}{10} \div 11 = 2\frac{9}{110} \text{ Ans.}$$

$$24. 78\frac{1}{4} \div 12 = 6\frac{3}{8} = 6\frac{1}{2} \text{ Ans.}$$

$$25. 189\frac{1}{5} \div 4 = 47\frac{1}{20} \text{ Ans.}$$

$$26. 107\frac{1}{2} \div 3 = 35\frac{2}{3} \text{ Ans.}$$

$$27. 17\frac{3}{4} \div 7 = 2\frac{3}{4} \text{ Ans.}$$

$$28. 106\frac{1}{2} \div 8 = 13\frac{3}{8} \text{ Ans.}$$

$$29. 100 \times 25 = 2500; 2500 \div 72 = \$0.34\frac{1}{8} \text{ Ans.}$$

$$30. 3 \times 2 = 6; 6 + 4 = 10; \$107\frac{7}{11} \div 10 = \$10\frac{7}{11} \text{ boy's share; } \$10\frac{7}{11} \times 2 = \$21\frac{2}{11} \text{ girl's share, Ans.}$$

$$31. \frac{1}{10} \text{ of a ton is } 17 \text{ cwt. ; and, if } 17 \text{ cwt. be divided by } 14, \text{ the quotient will be } 1 \text{ cwt. } 0 \text{ qr. } 24 \text{ lb. Ans.}$$

$$35. \frac{7}{8} \times \frac{4}{5} = 2\frac{1}{2} = 3\frac{1}{2} \text{ Ans.}$$

$$36. \frac{1}{3} \times \frac{1}{2} = \frac{1}{6} = \frac{1}{6} \text{ Ans.}$$

$$37. \frac{3}{4} \times \frac{1}{2} = \frac{3}{8} = 2\frac{3}{8} \text{ Ans.}$$

$$38. \frac{1}{10} \times \frac{6}{7} = \frac{6}{70} = 6\frac{3}{10} \text{ Ans.}$$

$$39. \frac{4}{5} \times \frac{1}{2} = \frac{4}{10} = 4\frac{2}{5} \text{ Ans.}$$

$$40. 7\frac{3}{8} = \frac{57}{8}; 4\frac{1}{2} = \frac{9}{2}; \frac{57}{8} \times \frac{9}{2} = \frac{513}{16} = 13\frac{5}{16} \text{ Ans.}$$

$$41. 3\frac{1}{2} = \frac{7}{2}; 7\frac{1}{2} = \frac{15}{2}; \frac{7}{2} \times \frac{15}{2} = \frac{105}{4} = 26\frac{1}{4} \text{ Ans.}$$

$$42. 11\frac{1}{2} = \frac{4^5}{2}; 5\frac{3}{7} = \frac{3^2}{7}; \frac{4^5}{2} \times \frac{3^2}{7} = \frac{315}{2} = 21\frac{1}{2} \text{ Ans.}$$

$$43. 4\frac{3}{7} = \frac{3^1}{7}; 1\frac{9}{9} = \frac{1^9}{9}; \frac{3^1}{7} \times \frac{1^9}{9} = \frac{279}{7} = 21\frac{5}{7} \text{ Ans.}$$

$$44. 116\frac{3}{7} = \frac{2^15}{7}; 14\frac{1}{7} = \frac{2^2}{7}; \frac{815}{7} \times \frac{7}{99} = \frac{815}{99} = 8\frac{23}{99} \text{ Ans.}$$

$$45. 81\frac{1}{7} = \frac{5^9}{7}; 9\frac{1}{5} = \frac{4^9}{5}; \frac{5^9}{7} \times \frac{4^9}{5} = \frac{2840}{322} = 81\frac{187}{322} \text{ Ans.}$$

$$46. \frac{3}{8} \times \frac{7}{8} = \frac{1^1}{2} = \frac{7}{2}; \frac{1}{7} \times \frac{3}{8} = \frac{3}{56}; \frac{7}{2} \times \frac{3}{56} = \frac{441}{224} = 18\frac{3}{8} \text{ Ans.}$$

Section 25. (p. 106.)

EXERCISES IN VULGAR FRACTIONS.

$$1. 9 \times 7 = 63 \text{ square inches, Ans.}$$

$$2. 11\frac{1}{2} = \frac{4^7}{2}; 4\frac{1}{4} = \frac{1^7}{4}; \frac{4^7}{2} \times \frac{1^7}{4} = \frac{792}{2} = 491\frac{1}{2} \text{ square inches, Ans.}$$

$$3. 18\frac{3}{7} = \frac{12^2}{7}; 9\frac{7}{10} = \frac{2^7}{10}; \frac{12^2}{7} \times \frac{2^7}{10} = \frac{12513}{70} = 178\frac{43}{70} \text{ rods, Ans.}$$

$$4. 19\frac{1}{2} = \frac{7^2}{2}; 17\frac{1}{4} = \frac{7^1}{4}; \frac{7^2}{2} \times \frac{7^1}{4} = \frac{5602}{2} = \$350\frac{2}{5} \text{ Ans.}$$

$$5. 14\frac{7}{10} = \frac{2^27}{10}; 7\frac{1}{2} = \frac{3^1}{2}; \frac{2^27}{10} \times \frac{3^1}{2} = \frac{2827}{2} = \$111\frac{17}{2} \text{ Ans.}$$

$$6. 13\frac{1}{10} = \frac{2^71}{10}; 8\frac{7}{8} = \frac{7^1}{8}; \frac{2^71}{10} \times \frac{7^1}{8} = \frac{18241}{80} = \$120\frac{41}{80} \text{ Ans.}$$

$$7. 1\frac{7}{8} = \frac{1^5}{8}; 1\frac{7}{8} = \frac{1^5}{8}; \frac{1^5}{8} \times \frac{1^5}{8} = \frac{225}{4} = \$3\frac{3}{4} \text{ Ans.}$$

$$8. \frac{2}{16} \times \frac{100}{100} = \frac{200}{1600} = \$0.56\frac{1}{4} \text{ Ans.}$$

$$9. \frac{17}{80} \times \frac{100}{100} = \frac{1700}{8000} = \$0.21\frac{1}{4} \text{ Ans.}$$

$$10. \frac{4}{160} \times \frac{100}{100} = \frac{400}{1600} = \$0.25\frac{1}{2} \text{ Ans.}$$

$$11. \frac{33}{64} \times \frac{100}{100} = \frac{3300}{6400} = \$0.51\frac{3}{8} \text{ Ans.}$$

12. As $\frac{2}{3}$ leaked out, $\frac{1}{3}$ remained in the cask, therefore

$$87\frac{1}{2} = 17\frac{1}{2}; \frac{1}{2} \times 17\frac{1}{2} = 8\frac{1}{4}; 27\frac{1}{2} = 5\frac{1}{2}; 8\frac{1}{4} \times 5\frac{1}{2} = 45\frac{1}{4} = \$15.03\frac{3}{4} \text{ Ans.}$$

$$13. 7\frac{3}{8} = 5\frac{9}{8}; 3\frac{1}{2} = 3\frac{1}{2}; 5\frac{9}{8} \times 3\frac{1}{2} = 18\frac{29}{8}; 4\frac{3}{8} = 3\frac{5}{8}; 5\frac{9}{8} \times 3\frac{5}{8} = 20\frac{65}{8}; 20\frac{65}{8} - 18\frac{29}{8} = 2\frac{36}{8} = \$3.68\frac{1}{2} \text{ Ans.}$$

$$14. 47\frac{1}{11} = 4\frac{22}{11}; 29\frac{7}{11} = 4\frac{7}{11}; 4\frac{22}{11} \times 4\frac{7}{11} = 24\frac{53}{11} = 1396\frac{83}{11} \text{ square rods; } 5 \times 5 = 25; 25 + 5 = 30; 1396\frac{83}{11} - 30 = 1366\frac{83}{11} \text{ square rods, Ans.}$$

$$15. 48\frac{1}{16} = 7\frac{7}{8}; 7\frac{7}{8} \times 2\frac{1}{2} = 7\frac{55}{16} = 4722\frac{1}{16} \text{ square rods; } 18\frac{1}{2} = 22\frac{1}{2}; 14\frac{3}{8} = 11\frac{1}{2}; 22\frac{1}{2} \times 11\frac{1}{2} = 254\frac{1}{2} = 2647\frac{1}{8} \text{ square rods; } 4722\frac{1}{16} - 2647\frac{1}{8} = 4457\frac{1}{16}; 4457\frac{1}{16} \times \$3.75 = \$16717.30\frac{1}{2} \text{ Ans.}$$

$$16. 8 \times 5 \times 3 = 120 \text{ solid feet, Ans.}$$

$$17. 7\frac{1}{2} = 3\frac{1}{2}; 4\frac{1}{2} = 5\frac{1}{2}; 3\frac{1}{2} = 2\frac{3}{2}; 3\frac{1}{2} \times 5\frac{1}{2} \times 2\frac{3}{2} = 37\frac{7}{8}; 37\frac{7}{8} \times 1\frac{1}{2} = 37\frac{7}{8} = 1312\frac{1}{4} \text{ feet, Ans.}$$

$$18. \$17.87\frac{1}{2} \div 2 = \$8.93\frac{3}{4}. \text{ Now, if } \frac{2}{5} \text{ of this sum were given to the Bible Society, } \frac{3}{5} \text{ of it will remain, therefore } \$8.93\frac{3}{4} \times \frac{3}{5} = \$3.57\frac{1}{2} \text{ Ans.}$$

$$19. 10\frac{1}{5} = 5\frac{1}{5}; 50 \times 5 = 250; 250 \div 54 = 4\frac{1}{2}; 12\frac{1}{2} - 4\frac{1}{2} = 8\frac{1}{10} \text{ Ans.}$$

$$20. 7\frac{3}{8} = 5\frac{9}{8}; 20 \times 8 = 160; 160 \div 59 = 2\frac{2}{5} \text{ Ans.}$$

$$21. 9\frac{7}{8} = 7\frac{7}{8}; \$4.62\frac{1}{2} = 2\frac{5}{2}; 7\frac{7}{8} \times 2\frac{5}{2} = 7\frac{307}{16} = \$45.67\frac{3}{16} \text{ Ans.}$$

$$22. 47\frac{1}{2} = 12\frac{1}{2}; \$12.37\frac{1}{2} = 24\frac{7}{2}; 12\frac{1}{2} = 10\frac{1}{2}; 24\frac{7}{2} \times 1\frac{1}{2} \times 10\frac{1}{2} = 10\frac{197}{16} = \$3.33\frac{5}{16} \text{ Ans.}$$

$$23. \$15.87\frac{1}{2} = 31\frac{7}{2}; 12\frac{3}{8} = 2\frac{3}{8}; 31\frac{7}{2} \times 2\frac{3}{8} \times 1\frac{1}{2} = 27\frac{84}{8} = \$14.11\frac{1}{8} \text{ Ans.}$$

$$24. \$19.18\frac{1}{4} = 7\frac{67}{4}; 3\frac{3}{8} = 2\frac{7}{8}; 7\frac{67}{4} \times 2\frac{7}{8} \times \frac{2}{3} = 18\frac{420}{4} = \$2.13\frac{7}{8} \text{ Ans.}$$

$$25. 8\frac{1}{2} = 10\frac{1}{2}; 3\frac{1}{2} = 4\frac{1}{2}; 2\frac{1}{2} = 2\frac{1}{2}; 10\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{1}{2} = 117\frac{7}{8} = 68\frac{1}{2} \text{ feet, Ans.}$$

Section 26. (p. 109.)**NUMERATION OF DECIMAL FRACTIONS**

| | |
|-----|------------|
| 1. | 307.25 |
| 2. | 47.7 |
| 3. | 18.05 |
| 4. | 29.003 |
| 5. | .0049 |
| 6. | 8.000008 |
| 7. | 75.9 |
| 8. | 2000.002 |
| 9. | 18.018 |
| 10. | 505.001006 |

Section 27. (p. 110.)**ADDITION OF DECIMALS.**

| | |
|---------------------|---------------------|
| 2. | 3. |
| 171.61111 | .16711 |
| 16.7101 | 1.766 |
| .00007 | 76111.1 |
| 71.0006 | 167.1 |
| 1.167895 | .000007 |
| <u>260.489775</u> | 1476.1 |
| | <u>77756.233117</u> |
| 4. | 5. |
| 151.01 | 56000.014 |
| 611111.01 | 19.19 |
| 16.5 | 57.0048 |
| 6.7 | 23005.4 |
| 46.1 | .000014 |
| .67896 | <u>79081.608814</u> |
| <u>611331.99896</u> | |

| 6. | 7. |
|-------------------|---------------------|
| 49.0105 | 3.0018 |
| 89.107 | 1005.023043 |
| .000127 | 87.107 |
| .0048 | .0049 |
| <u>138.122427</u> | <u>47000.00309</u> |
| | <u>48095.139833</u> |

Section 28. (p. 111.)

SUBTRACTION OF DECIMALS.

| | | | |
|------------------|-------------------|------------|------------|
| 5. | 6. | | |
| 81.35 | 1. | | |
| <u>11.678956</u> | <u>.876543</u> | | |
| 69.671044 | .123457 | | |
| 7. | 8. | | |
| 100. | 87.1 | | |
| <u>99.111176</u> | <u>5.6789</u> | | |
| .888824 | 81.4211 | | |
| 9. | 10. | | |
| 100. | 73. | | |
| <u>.001</u> | <u>.073</u> | | |
| 99.999 | 72.927 | | |
| 11. | 12. | | |
| 365. | 357000. | | |
| <u>.0047</u> | <u>28.0004009</u> | | |
| 364.9953 | 356971.9995991 | | |
| 13. | 14. | 15. | 16. |
| .875 | .3125 | .95 | 3.7 |
| .4 | .125 | .44 | 1.8 |
| <u>.475</u> | <u>.1875</u> | <u>.51</u> | <u>1.9</u> |

KEY TO

[8.]

$$\begin{array}{r} 17. \\ 8.125 \\ 2.6875 \\ \hline 5.4375 \end{array}$$

$$\begin{array}{r} 18. \\ 9.375 \\ 1.5 \\ \hline 7.875 \end{array}$$

$$\begin{array}{r} 19. \\ .666 \\ .041 \\ \hline .625 \end{array}$$

Section 29. (p. 112.)

MULTIPLICATION OF DECIMALS

$$\begin{array}{r} 10. \\ .087 \\ .000015 \\ \hline .000001305 \end{array}$$

$$\begin{array}{r} 11. \\ 107000.0015 \\ .0107 \\ \hline 7490000105 \\ 1070000015 \\ \hline 114490001605 \end{array}$$

$$\begin{array}{r} 12. \\ .0097 \\ 400.67 \\ \hline 679 \\ 582 \\ 388 \\ \hline 3.886499 \end{array}$$

$$\begin{array}{r} 13. \\ .096 \\ .00096 \\ \hline 576 \\ 864 \\ \hline .00009216 \end{array}$$

$$\begin{array}{r} 14. \\ 1000000. \\ .000001 \\ \hline 1. \end{array}$$

$$\begin{array}{r} 15. \\ 100. \\ .0014 \\ \hline 400 \\ 100 \\ \hline .14 \end{array}$$

$$\begin{array}{r} 16. \\ .101 \\ .10101 \\ \hline 101 \\ 101 \\ \hline 101 \\ \hline .01020201 \end{array}$$

$$\begin{array}{r} 17. \\ 1050.0007 \\ .00305 \\ \hline 52500035 \\ 31500021 \\ \hline 3.202502135 \end{array}$$

$$\begin{array}{r} 18. \\ 2000000. \\ .7 \\ \hline 1400000. \end{array}$$

19.

$$\begin{array}{r}
 400,004 \\
 30.03 \\
 \hline
 1200012 \\
 1200012 \\
 \hline
 12012.12012
 \end{array}$$

20.

$$\begin{array}{r}
 \$1.125 \\
 46. \\
 \hline
 6750 \\
 4500 \\
 \hline
 \$51.75
 \end{array}$$

21.

$$\begin{array}{r}
 \text{Tons } 17.125 \\
 \$18.875 \\
 \hline
 85625 \\
 119875 \\
 \bullet 137000 \\
 137000 \\
 17125 \\
 \hline
 \$323.234375
 \end{array}$$

22.

$$\begin{array}{r}
 \$1.125 \\
 18. \\
 \hline
 1000 \\
 125 \\
 \hline
 \$2.250
 \end{array}$$

Section 30. (p. 113.)

DIVISION OF DECIMALS.

8.

$$12)172.8(144.$$

9.

$$.12)1728(14400.$$

10.

$$.12).1728(1.44$$

11.

$$12)1.728(.144$$

12.

$$12)17.28(1.44$$

13.

$$.0012)1728(1440000.$$

14.

$$12).001728(.000144$$

15.

$$9.7)147.828(15.24$$

16.

$$328).678767(2.069$$

Section 31. (p. 114.)

REDUCTION OF DECIMALS.

$$\begin{array}{r} 2. \\ 4 \overline{) 3.00} \\ \underline{75} \end{array}$$

$$\begin{array}{r} 3. \\ 8 \overline{) 7.000} \\ \underline{.875} \end{array}$$

$$\begin{array}{r} 4. \\ 16 \overline{) 7.0000} \\ \underline{.4375} \end{array}$$

$$\begin{array}{r} 5. \\ 11 \overline{) 4.000000} \\ \underline{.363636} + \end{array}$$

$$\begin{array}{r} 6. \\ 12 \overline{) 5.000000} \\ \underline{.416666} + \end{array}$$

$$\begin{array}{r} 8. \\ 12 \overline{) 6.0} \\ 20 \overline{) 15.5} \\ \underline{.775} \end{array}$$

$$\begin{array}{r} 9. \\ 28 \overline{) 14.0} \\ 4 \overline{) 2.500} \\ 20 \overline{) 5.6250} \\ \underline{.28125} \end{array}$$

$$\begin{array}{r} 10. \\ 28 \overline{) 21.00} \\ 4 \overline{) 3.7500} \\ \underline{.9375} \end{array}$$

$$\begin{array}{r} 11. \\ 40 \overline{) 8.0} \\ 8 \overline{) 6.200} \\ \underline{.775} \end{array}$$

$$\begin{array}{r} 12. \\ 144 \overline{) 72.0} \\ 272 \overline{) 167.5} \\ 40 \overline{) 19.615243} \\ 4 \overline{) 3.490381} \\ \underline{.872595} + \end{array}$$

CASE III.

$$\begin{array}{r} 1. \\ 628125 \\ 20 \overline{) 12.562500} \\ 12 \overline{) 6.750000} \\ 4 \overline{) 3.000000} \\ \text{Ans. 12s. 6} \frac{1}{4} \text{d.} \end{array}$$

$$\begin{array}{r} 2. \\ 778125 \\ 20 \overline{) 15.562500} \\ 4 \overline{) 2.250000} \\ 28 \overline{) 7.000000} \\ \text{Ans. 15cwt. 2qr. 7lb} \end{array}$$

| 3. | 4. | 5. |
|----------------|------------------|-----------------|
| .75 | .965625 | 94375 |
| 5 | 8 | 4 |
| <u>3.75</u> | <u>7.725000</u> | <u>3.77500</u> |
| 4 | 40 | 40 |
| <u>3.00</u> | <u>29.000000</u> | <u>31.00000</u> |
| Ans. 3qr. 3na. | Ans. 7fur. 29rd. | Ans. 3R. 31p. |

| 6. | 7. |
|------------------------|-------------------------|
| .815625 | .5555 |
| 12 | 12 |
| <u>9.787500</u> | <u>6.6660</u> |
| 20 | 8 |
| <u>15.750000</u> | <u>5.3280</u> |
| 24 | 3 |
| <u>18.000000</u> | <u>.9840</u> |
| Ans. 9oz. 15dwt. 18gr. | 20 |
| | <u>19.6800</u> |
| | Ans. 6½. 53. 09. 19½gr. |

Section 32. (p. 117.)

EXERCISES IN DECIMALS.

| 1. | 2. |
|---------------------|----------------------|
| 28 14.0 | 28 7.00 |
| 4 3.500 | 4 1.2500 |
| <u>15.875</u> | <u>18.3125</u> |
| \$9.50 | 17.915625 |
| <u>793750</u> | \$53.80 |
| 142875 | <u>1433250000</u> |
| <u>\$150.81,250</u> | 53746875 |
| | 89578125 |
| | <u>\$963.86,0625</u> |

3.

$$\begin{array}{r}
 40 \overline{) 16.0} \\
 4 \overline{) 3.40} \\
 \hline
 37.85 \\
 \$75.16 \\
 \hline
 22710 \\
 3785 \\
 18925 \\
 26495 \\
 \hline
 \$2844.80,6
 \end{array}$$

4.

$$\begin{array}{r}
 4 \overline{) 2.0} \\
 4 \overline{) 3.500} \\
 \hline
 15.875 \\
 \$3.75 \\
 \hline
 79375 \\
 111125 \\
 47625 \\
 \hline
 \$59.53,125
 \end{array}$$

5.

$$\begin{array}{r}
 15.375 \\
 \$4.625 \\
 \hline
 76875 \\
 30750 \\
 92250 \\
 61500 \\
 \hline
 \$71.10,9375
 \end{array}$$

6.

$$\begin{array}{r}
 40 \overline{) 36.0} \\
 8 \overline{) 6.9000} \\
 \hline
 17.8625 \\
 \$3765.60 \\
 \hline
 10717500 \\
 893125 \\
 1071750 \\
 1250375 \\
 535875 \\
 \hline
 \$67263.03,0000
 \end{array}$$

7.

$$\begin{array}{r}
 63 \overline{) 21.0} \\
 27.333+ \\
 \$15.375 \\
 136665 \\
 191331 \\
 84999 \\
 136665 \\
 27333 \\
 \hline
 \$420.24,4875+
 \end{array}$$

8.

$$\begin{array}{r}
 12 \overline{) 9.00} \quad 12 \overline{) 6.0} \quad 12 \overline{) 3.00} \\
 18.75 \quad 4.5 \quad 7.25 \\
 \hline
 4.5 \\
 3625 \\
 2900 \\
 32625 \\
 18.75 \\
 \hline
 163125 \\
 228375 \\
 261000 \\
 32625 \\
 \hline
 \text{Feet } 611.71875
 \end{array}$$

(Carried up.)

(Brought up.)

$$\begin{array}{r}
 611.71875 \\
 1728 \\
 \hline
 575000 \\
 143750 \\
 508125 \\
 71875 \\
 \hline
 \text{Inches } 1242.00000
 \end{array}$$

Ans. 611ft. 1242in.

9.

$$\begin{array}{r}
 12 \overline{) 60} \\
 \underline{125} \\
 275 \\
 \underline{625} \\
 875 \\
 \underline{250} \\
 34375 \\
 \underline{144} \\
 1500 \\
 1500 \\
 \underline{375} \\
 54000
 \end{array}$$

Ans. 34ft. 54in.

10.

$$\begin{array}{r}
 2 \overline{) 10} \\
 \underline{43500} \\
 25875 \\
 \underline{\$375} \\
 129375 \\
 181125 \\
 \underline{77625} \\
 \$9703125
 \end{array}$$

11.

$$\begin{array}{r}
 40 \overline{) 3000} \\
 \underline{4} \\
 1449375 \\
 \underline{\$9762\frac{1}{2}} \\
 2898750 \\
 8696250 \\
 10145625 \\
 13044375 \\
 \underline{7246875} \\
 \$141495234375
 \end{array}$$

12.

$$\begin{array}{r}
 28 \overline{) 2100} \\
 \underline{4} \\
 20 \overline{) 181875} \\
 \underline{3909375} \\
 \underline{\$9375} \\
 19546875 \\
 27365625 \\
 11728125 \\
 35184375 \\
 \underline{36650390625} \\
 2025
 \end{array}$$

Ans. \$16.40 +

13.

$$\begin{array}{r}
 \$5.50 \\
 8 \\
 7 \overline{) 44.00} \\
 \underline{\$6.284} \\
 775 \\
 3140 \\
 4396 \\
 4396 \\
 442\frac{1}{2} \\
 \$48.7142\frac{1}{2} \text{ Ans.}
 \end{array}$$

Section 33. (p. 119.)

SIMPLE INTEREST.

| 3. | 4. | 5. | 6. |
|-----------------|-----------------|---------------|-----------------|
| \$197 | \$1728 | \$69 | \$1775 |
| .06 | .06 | .06 | .06 |
| <u>\$111.82</u> | <u>103.68</u> | <u>4.14</u> | <u>106.50</u> |
| | 3 | 2 | 7 |
| | <u>\$311.04</u> | <u>\$8.28</u> | <u>\$745.50</u> |

| 7. | 8. | 9. |
|-----------------|-------------------|-------------------|
| \$987 | \$69.17 | 96.87 |
| .06 | .06 | .06 |
| <u>59.22</u> | <u>4.1502</u> | <u>5.8122</u> |
| 10 | 4 | 11 |
| <u>\$592.20</u> | <u>\$16.60,08</u> | <u>\$63.93,42</u> |

| 10. | 11. | 12. |
|-----------------|------------------|---------------------|
| \$1.95 | \$1789 | \$666.66 |
| .06 | .06 | .06 |
| <u>1170</u> | <u>107.34</u> | <u>39.9996</u> |
| 18 | 20 | 30 |
| <u>\$210,60</u> | <u>\$2146.80</u> | <u>\$1199.98,80</u> |

| 13. | 14. |
|--------------------|--------------------|
| \$98.50 | \$168.13 |
| .06 | .06 |
| <u>5.9100</u> | <u>10.0878</u> |
| 5 | 11 |
| <u>29.5500</u> | <u>110.9658</u> |
| <u>98.50</u> | <u>168.13</u> |
| <u>\$128.05,00</u> | <u>\$279.09,58</u> |

| 15. | 16. |
|--------------------|------------------|
| \$75.75 | \$675.50 |
| .06 | .06 |
| <u>45450</u> | <u>405300</u> |
| 17 | 100 |
| <u>77.2650</u> | <u>4053.00</u> |
| 75.75 | 675.50 |
| <u>\$153.01,50</u> | <u>\$4728.50</u> |

CASE II.

| 2. | 3. | 4. |
|-------------------|--------------------|---------------------|
| \$1728 | \$16.87 | \$118.15 |
| .09 | .10 | .15 |
| <u>\$155.52</u> | <u>\$1.68,70</u> | <u>59075</u> |
| | | 11815 |
| | | <u>\$17.72,25</u> |
| 5. | 6. | 7. |
| \$97.16 | \$789.87 | \$978.18 |
| .08 $\frac{1}{2}$ | .11 $\frac{1}{2}$ | .13 $\frac{1}{2}$ |
| <u>77728</u> | <u>868857</u> | <u>293454</u> |
| 4858 | 39493 | 97818 |
| <u>\$8.25,86</u> | <u>\$90.83,50</u> | <u>48900</u> |
| | | 132.0543 |
| | | 978.18 |
| | | <u>\$1110.23,43</u> |
| 8. | 9. | 10. |
| \$87.96 | \$81.81 | \$.87 |
| .00 $\frac{1}{2}$ | .50 | .43 $\frac{1}{2}$ |
| <u>.4398</u> | <u>40.9050</u> | <u>261</u> |
| 87.96 | 81.81 | 348 |
| <u>\$88.39,98</u> | <u>\$122.71,50</u> | <u>43</u> |
| | | .3784 |
| | | .87 |
| | | <u>\$124.84</u> |

KEY TO

[SECT. 32.]

CASE III.

3.
 \$761.75
 .073
 228525
 533225
 \$555.60,775

4.
 \$1728.19
 .0863
 1036914
 1382552
 115212
 \$149.77,646

5.
 \$88.96
 .081
 8896
 71168
 \$7.20,576

6.
 \$107.50
 .0093
 96750
 8958
 \$1.05,708

7.
 \$87.25
 .1003
 872500
 7270
 \$8.79,770

8.
 \$73.16
 .0983
 58528
 65844
 6096
 \$7.23,064

9.
 \$1.71
 .1203
 3420
 17157
 \$2.05,77

10.
 \$100
 .5003
 50000
 18
 \$50.01,6

11.
 \$3.05
 .0103
 3050
 101
 \$3.03,151

CASE IV.

2.
 y. mo. da.
 1841 4 5
 1838 11 10
 2 4 25

\$169.75
 .1443
 67900
 67900
 16975
 2829
 \$24.47,229

3.
 y. mo. da.
 1841 8 1
 1837 6 29
 4 1 2

\$17.18
 .2453
 8590
 6872
 3436
 572
 \$4.21,482

4.
 y. mo. da.
 1841 11 11
 1839 3 7
 2 8 4

\$67.07
 .1603
 402420
 6707
 4471
 \$10.77,591

5.

| y. | mo. | da. |
|-------|-----|-----|
| 1841 | 11 | 19 |
| 1839 | 0 | 7 |
| <hr/> | | |
| 2 | 11 | 12 |

\$117.75
.177
 82425
 82425
 11775
\$2084,175

6.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 0 | 11 |
| 1839 | 9 | 9 |
| <hr/> | | |
| 3 | 3 | 2 |

\$847.15
.195½
 423575
 762435
 84715
28238
\$165.47,663

7.

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 1 | 11 |
| 1841 | 2 | 1 |
| <hr/> | | |
| | 11 | 10 |

\$7.18
.056½
 4308
 3590
 478
\$.40,686

8.

| y. | mo. | da. |
|-------|-----|-----|
| 1845 | 10 | 25 |
| 1842 | 4 | 29 |
| <hr/> | | |
| 3 | 5 | 26 |

\$976.18
.209½
 878562
 195236
 32539
\$20434,701

9.

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 2 | 9 |
| 1839 | 6 | 25 |
| <hr/> | | |
| 2 | 7 | 14 |

\$144
.157½
 1008
 720
 14448
22656
 144
\$166.65,6

10.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 11 | 7 |
| 1841 | 5 | 4 |
| <hr/> | | |
| 2 | 6 | 3 |

\$123.
.150½
 6150
 12361
 1851,1
 123
\$141.51,1

11.

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 0 | 1 |
| 1840 | 0 | 19 |
| <hr/> | | |
| 1 | 11 | 12 |

| |
|--------------|
| \$375.83 |
| .117 |
| <hr/> |
| 263081 |
| 37583 |
| <hr/> |
| 37583 |
| <hr/> |
| 4397211 |
| 375.83 |
| <hr/> |
| 41980211 |
| 7933918 |
| <hr/> |
| \$499.14,129 |

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 0 | 1 |
| 1841 | 3 | 23 |
| <hr/> | | |
| 8 | 8 | |

| |
|--------------------|
| \$76.19 |
| .041 $\frac{1}{2}$ |
| <hr/> |
| 7619 |
| 30476 |
| <hr/> |
| 2539 |
| <hr/> |
| 314918 |
| 76.19 |
| <hr/> |
| \$7933918 |

12.

| y. | mo. | da. |
|-------|-----|-----|
| 1841 | 5 | 11 |
| 1840 | 5 | 5 |
| <hr/> | | |
| 1 | 0 | 6 |

| |
|-----------|
| \$68.19 |
| .061 |
| <hr/> |
| 6819 |
| 40914 |
| <hr/> |
| \$415,959 |
| 7 |
| <hr/> |
| 6)2911713 |
| <hr/> |
| \$485,285 |

13.

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 11 | 30 |
| 1839 | 1 | 17 |
| <hr/> | | |
| 3 | 10 | 13 |

| |
|--------------------|
| \$79.15 |
| .232 $\frac{1}{2}$ |
| <hr/> |
| 15830 |
| 23745 |
| <hr/> |
| 15830 |
| 1319 |
| <hr/> |
| \$1837599 |
| 7 $\frac{1}{2}$ |
| <hr/> |
| 12863193 |
| 918799 |
| <hr/> |
| 6)13781992 |
| 2296998 |
| <hr/> |
| 79.15 |
| <hr/> |
| \$102.11,998 |

14.

| y. | mo. | da. |
|-------|-----|-----|
| 1841 | 11 | 9 |
| 1840 | 5 | 19 |
| <hr/> | | |
| 1 | 5 | 20 |

| |
|--------------------|
| \$89.96 |
| .088 $\frac{1}{2}$ |
| <hr/> |
| 71968 |
| 71968 |
| <hr/> |
| 791648 |
| 2998 |
| <hr/> |
| 794,646 |
| 8 $\frac{1}{2}$ |
| <hr/> |
| 6357168 |
| 198661 |
| <hr/> |
| 6)6555829 |
| 1092,638 |
| <hr/> |
| 89.96 |
| <hr/> |
| \$100.88,638 |

15.

| y. | mo. | da. |
|-------|-----|-----|
| 1841 | 6 | 4 |
| 1839 | 5 | 5 |
| <hr/> | | |
| 2 | 0 | 29 |

| |
|--------------------|
| \$325. |
| .124 $\frac{1}{2}$ |
| <hr/> |
| 1300 |
| 650 |
| <hr/> |
| 325 |
| 270 |
| <hr/> |
| 40570 |
| 7 $\frac{1}{2}$ |
| <hr/> |
| 283990 |
| 10142 |
| <hr/> |
| 6)294.132 |
| 490.22 |
| <hr/> |
| 325. |
| <hr/> |
| \$374.022 |

| 16. | | | 17. | | | 18. | | |
|--------------------|-----|-----|--------------------|-----|-----|-----------------|-----|-----|
| y. | mo. | da. | y. | mo. | da. | y. | mo. | da. |
| 1842 | 9 | 9 | 1842 | 6 | 4 | 1843 | 8 | 7 |
| 1839 | 11 | 29 | 1841 | 0 | 29 | 1839 | 5 | 19 |
| <hr/> | | | <hr/> | | | <hr/> | | |
| 2 | 9 | 10 | 1 | 5 | 5 | 4 | 2 | 18 |
| \$1728 | | | \$976.18 | | | \$176.17 | | |
| .166 $\frac{2}{3}$ | | | .085 $\frac{1}{2}$ | | | .253 | | |
| <hr/> | | | <hr/> | | | <hr/> | | |
| 10368 | | | 488090 | | | 52851 | | |
| 10368 | | | 780944 | | | 88085 | | |
| 1728 | | | 81348 | | | 35234 | | |
| 1152 | | | <hr/> | | | <hr/> | | |
| 288000 | | | 8378,878 | | | 4457101 | | |
| 9 | | | 2 | | | 9 $\frac{1}{2}$ | | |
| 6)2592000 | | | \$167.57,756 | | | 40113909 | | |
| \$432.000 | | | | | | 3342825 | | |
| 1728. | | | | | | 6)43456734 | | |
| \$2160.00,0 | | | | | | \$72.42,789 | | |

| 19. | | | 20. | | |
|--------------------|-----|-----|---------------------|-----|-----|
| y. | mo. | da. | y. | mo. | da. |
| 1843 | 11 | 17 | 1847 | 7 | 23 |
| 1841 | 5 | 1 | 1808 | 11 | 3 |
| <hr/> | | | <hr/> | | |
| 2 | 6 | 16 | 38 | 8 | 20 |
| \$87.25 | | | \$379.78 | | |
| .152 $\frac{1}{2}$ | | | .2323 $\frac{1}{2}$ | | |
| <hr/> | | | <hr/> | | |
| 17450 | | | 113934 | | |
| 43625 | | | 75956 | | |
| 8725 | | | 113934 | | |
| 5816 | | | 75956 | | |
| <hr/> | | | <hr/> | | |
| 1332,016 | | | 12659 | | |
| 5 | | | 882.35,553 | | |
| 6)6660080 | | | 7 $\frac{1}{2}$ | | |
| 1110,013 | | | 6176.48871 | | |
| 87.25 | | | 661.76664 | | |
| \$98.35,013 | | | 6)6838.25535 | | |
| | | | 1139.70,922 | | |
| | | | 379.78 | | |
| | | | \$1519.48,922 | | |

Section 34. (p. 125.)

PARTIAL PAYMENTS

2.

Principal \$876.5
 Interest for 10 months 11 days 45.4

Amount \$921.9

First payment \$97.00

Interest for 8 months 3.88

Second payment 265.00

Interest for 7 months 5 days 9.49

Third payment 170.00

Interest for 4 months 25 days 4.10

Fourth payment 79.00

Interest for 1 month 2 days 42

\$628.8

Balance due Aug. 6, 1843 \$293.0

y. mo. da.
1843 7 6

1842 8 25

10 11

\$876.50

.05 1 $\frac{1}{2}$

87650

438250

73041

\$45.43,191

y. mo. da.
1843 7 6

1842 11 6

8 0

\$97.00

.04

\$3.88,00

y. mo. da.
1843 7

1843 0

7

\$265.00

035

132500

79500

22083

\$9.49,583

y. mo. da.
1843 7 6

1843 2 11

4 25

\$170

.024 $\frac{1}{2}$

680

340

28

\$4.10,8

y. mo. da.
1843 7 6

1843 6 4

1 2

\$79

.005 $\frac{1}{2}$

395

26

\$42.1

3.

| | |
|-----------------------------------|-------------------------|
| Principal | \$987.75 |
| Interest for 9 months 2 days | 44.77 |
| | <u>Amount \$1032.52</u> |
| First payment | \$300.00 |
| Interest for 7 months 12 days | 11.10 |
| Second payment | 400.00 |
| Interest for 6 months 8 days | 12.53 |
| Third payment | 150.00 |
| Interest for 2 months 18 days | 1.95 |
| | <u>\$875.58</u> |
| Balance remains due Dec. 13, 1842 | <u>\$156.94</u> |

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 11 | 13 |
| 1842 | 0 | 11 |
| <hr/> | | |
| 0 | 11 | 2 |
| | 2 | 0 |
| <hr/> | | |
| 0 | 9 | 2 |

| |
|-------------------|
| \$987.75 |
| .0454 |
| <u>493875</u> |
| 395100 |
| 32925 |
| <u>\$4477,800</u> |

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 11 | 13 |
| 1842 | 4 | 1 |
| <hr/> | | |
| | 7 | 12 |

| |
|-----------------|
| \$300 |
| .037 |
| <u>2100</u> |
| 900 |
| <u>\$11,100</u> |

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 11 | 13 |
| 1842 | 5 | 5 |
| <hr/> | | |
| 6 | 8 | |

| |
|----------------|
| \$400 |
| .0314 |
| <u>400</u> |
| 1200 |
| 133 |
| <u>\$12533</u> |

| y. | mo. | da. |
|-------|-----|-----|
| 1842 | 11 | 13 |
| 1842 | 8 | 25 |
| <hr/> | | |
| | 2 | 18 |

| |
|----------------|
| \$150 |
| .013 |
| <u>450</u> |
| 150 |
| <u>\$195,0</u> |

4.

| | | |
|--------------------------------|----------|-----------------|
| Principal | | \$800.00 |
| Interest for 10 months 27 days | | 43.60 |
| | Amount | <u>\$843.60</u> |
| First payment | \$144.00 | |
| Interest for 9 months 21 days | 6.98 | |
| Second payment | 90.00 | |
| Interest for 7 months | 3.15 | |
| Third payment | 400.00 | |
| Interest for 5 months | 10.00 | |
| Fourth payment | 100.00 | |
| Interest for 2 months 27 days | 1.45 | |
| | | <u>\$755.58</u> |
| Remains due June 1, 1843 | | <u>\$88.02</u> |

| y. | mo. | da. |
|--------------|-----|-----|
| 1843 | 5 | 1 |
| 1842 | 6 | 4 |
| <u>10 27</u> | | |

| |
|------------------|
| \$800 |
| .054½ |
| <u>3200</u> |
| 4000 |
| 400 |
| <u>\$43.60,0</u> |

| y. | mo. | da. |
|-------------|-----|-----|
| 1843 | 5 | 1 |
| 1842 | 7 | 10 |
| <u>9 21</u> | | |

| |
|-----------------|
| \$144 |
| .048½ |
| <u>1152</u> |
| 576 |
| 72 |
| <u>\$6.98,4</u> |

| y. | mo. | da. |
|------------|-----|-----|
| 1843 | 5 | 1 |
| 1842 | 10 | 1 |
| <u>7 0</u> | | |

| |
|-----------------|
| \$90 |
| .035 |
| <u>450</u> |
| 270 |
| <u>\$3.15,0</u> |

| y. | mo. | da. |
|------------|-----|-----|
| 1843 | 5 | 1 |
| 1843 | 0 | 1 |
| <u>5 0</u> | | |

| |
|-----------------|
| \$400 |
| .025 |
| <u>2000</u> |
| 800 |
| <u>\$1000,0</u> |

| y. | mo. | da. |
|-------------|-----|-----|
| 1843 | 5 | 1 |
| 1843 | 2 | 4 |
| <u>2 27</u> | | |

| |
|-----------------|
| \$100 |
| .014½ |
| <u>400</u> |
| 100 |
| 50 |
| <u>\$1.45,0</u> |

CASE II.

2.

| | | |
|--|--------|----------------|
| al carrying interest from April 10, | | \$1 000.00 |
| at from April 10, 1836, to July 4, 1836, | | |
| months 24 days | | <u>1 4.00</u> |
| | Amount | 1 014.00 |
| ayment | | <u>1 00.00</u> |
| | | 9 14.00 |
| at from July 4, 1836, to Jan. 1, 1837, | | |
| months 24 days | | <u>2 6.96</u> |
| | Amount | 9 40.96 |
| l payment. | | <u>2 00.00</u> |
| | | 7 40.96 |
| at from Jan. 1, 1837, to Sept. 25, 1838, | | |
| months 24 days | | <u>7 7.05</u> |
| | Amount | 8 18.01 |
| payment | | <u>3 00.00</u> |
| | | 5 18.01 |
| at from Sept. 25, 1838, to March 9, | | |
|), 5 months 14 days | | <u>1 4.15</u> |
| | Amount | 5 32.16 |
| l payment | | <u>1 00.00</u> |
| | | 4 32.16 |
| at from March 9, 1839, to April 7, 1840, | | |
| months 28 days | | <u>2 7.94</u> |
| | Amount | 4 60.10 |
| ayment | | <u>2 50.00</u> |
| | | 2 10.10 |
| at from April 7, 1840, to Jan. 10, 1842, | | |
| months 3 days | | <u>2 2.16</u> |
| | | \$232.26 |

3.

| | |
|---|----------------|
| Principal carrying interest from June 5, 1838, | \$ 1 6 6 6.0 0 |
| Interest from June 5, 1838, to January 1, 1841, 30 months 26 days | 257.11 |
| | <u>1923.11</u> |
| First payment, July 4, 1839, a sum less than the interest | \$ 100.00 |
| Second payment, Jan. 1, 1840, a sum less than the interest | 10.00 |
| Third payment, July 4, 1840, a sum less than the interest | 15.00 |
| Fourth payment, Jan. 1, 1841, a sum larger than the interest | 500.00 |
| | <u>625.00</u> |
| | 1298.11 |
| Interest from Jan. 1, 1841, to Feb. 7, 1842, 13 months 6 days | 85.67 |
| | <u>1383.78</u> |
| Fifth payment Feb. 7, 1842 | 656.00 |
| | <u>727.78</u> |
| Interest from Feb. 7, 1842, to Jan. 1, 1843, 10 months 24 days | 39.30 |
| | <u>767.08</u> |
| Remains due Jan. 1, 1843 | |

Section 35. (p. 128.)

COMMISSION AND BROKERAGE.

| 1. | 2. | 3. |
|-----------------|-----------------|---------------|
| \$5678 | \$7896 | \$1728 |
| .03 | .02 | .01 |
| <u>\$170.34</u> | <u>\$157.92</u> | <u>1728</u> |
| | | 864 |
| | | <u>\$2592</u> |

| 4. | 5. | |
|-------------------|--------------------|-----------------|
| \$15.50 | \$6.50 | \$2.75 |
| 97 | 500 | 88 |
| <u>10850</u> | <u>3250.00</u> | <u>2200</u> |
| 13950 | 242.00 | 2200 |
| <u>150350</u> | <u>593.60</u> | <u>\$242.00</u> |
| .02 $\frac{1}{2}$ | <u>4085.60</u> | |
| <u>300700</u> | .03 $\frac{1}{2}$ | |
| 75175 | <u>1225680</u> | |
| <u>\$37,58,75</u> | <u>306420</u> | |
| | <u>\$153,21,00</u> | |

| 6. | 7. |
|-----------------|---------------|
| \$10.60 | \$30 |
| 56 | 50 |
| <u>6360</u> | <u>\$1500</u> |
| 5300 | |
| <u>\$593.60</u> | |

Section 36. (p. 129.)

INSURANCE AND POLICIES.

| 1. | 2. | 3. | 4. |
|-----------------|-----------------|-------------------|-------------------|
| \$868 | \$1728 | \$3500 | \$35000 |
| .12 | .15 | .01 $\frac{1}{2}$ | .03 $\frac{1}{2}$ |
| <u>\$104.16</u> | <u>8640</u> | <u>3500</u> | <u>105000</u> |
| | 1728 | 2625 | 26250 |
| | <u>\$259.20</u> | <u>\$61.25</u> | <u>\$1312.50</u> |
| | | | \$35000.00 |
| | | | 1312.50 |
| | | | <u>\$33687.50</u> |

Section 37. (p. 130.)

STOCKS.

| 2. | 3. | 4. |
|--------------|-------------------|------------------|
| \$100 | \$8979 | \$1789 |
| 75 | 1.12 | .91 |
| <u>7500</u> | <u>1077.48</u> | <u>1789</u> |
| 1.25 | 8979 | 16101 |
| <u>37500</u> | <u>\$10056.48</u> | <u>\$1627.99</u> |
| 15000 | | |
| <u>7500</u> | | |
| \$9375.00 | | |

Section 38. (p. 131.)

BANKING.

| 1. | 2. | 3. | 4. |
|---------------|---------------|-------------|----------------------|
| \$478 | \$780 | \$1728 | \$1000 |
| .0101 | .0051 | .151 | .201 |
| <u>4780</u> | <u>3900</u> | <u>8640</u> | <u>20000</u> |
| 239 | 390 | 1728 | 500 |
| <u>\$5019</u> | <u>\$4290</u> | <u>864</u> | <u>\$20500</u> |
| | | \$2678.4 | |
| | | | \$1000 |
| | | | 20.50 |
| | | | <u>Ans. \$979.50</u> |

Section 39. (p. 132.)

DISCOUNT.

2.

$$1.06)152.64(\$144$$

3.

$$1.24)477.71(\$385.25$$

4.

$$1.20)172.86(\$144.05$$

5.

$$1.218)800.00(\$656.81+$$

6.

| y. | mo. | da. |
|-------|-----|-----|
| 1844 | 0 | 1 |
| 1842 | 9 | 4 |
| <hr/> | | |
| 1 | 2 | 27 |

7.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 3 | 5 |
| 1843 | 0 | 1 |
| <hr/> | | |
| 3 | 4 | |

$$1.0745)\$375.75(\$349.69+$$

Ans.

$$1.0153)125.75(\$123.81+$$

[Ans.

NOTE. The divisors to the above questions are obtained by considering one half of the months and one sixth of the days a decimal, to be annexed to a unit. That is, the interest of one dollar is equal to half the number of months in cents; and to one sixth the number of days in mills, when the rate is 6 per cent.

8.

$$1\frac{1}{2} = 1.75; 1.75 \times .95 = 1.6625.$$

$$1.6625 = 6\frac{133}{1000} = 6\frac{133}{1000}$$

$$6\frac{133}{1000} \times \frac{100}{95} = 6\frac{8832}{9500}$$

$$12635)80000(6 \text{ yards.}$$

$$\begin{array}{r} 75810 \\ 4190 \\ 4 \end{array}$$

$$12635)16760(1 \text{ quarter.}$$

$$\begin{array}{r} 12635 \\ 4125 \\ 4 \end{array}$$

$$12635)16500(1\frac{773}{2527} \text{ na.}$$

$$\begin{array}{r} 12635 \\ 3865 \end{array}$$

Section 40. (p. 133.)

COMPOUND INTEREST.

| 2. | 3. | 4. |
|---------------|---------------|--------------|
| \$761.75 | \$67.25 | \$78.69 |
| <u>1.06</u> | <u>1.06</u> | <u>1.07</u> |
| 457050 | 40350 | 55083 |
| <u>76175</u> | <u>6725</u> | <u>7869</u> |
| 807.45 | 71.28,5 | 84.198 |
| <u>1.06</u> | <u>1.06</u> | <u>1.07</u> |
| 484470 | 427710 | 589386 |
| <u>80745</u> | <u>71285</u> | <u>84198</u> |
| 855.89 | 75.56,21 | 90.091 |
| <u>1.06</u> | <u>1.06</u> | <u>1.07</u> |
| 513534 | 453372 | 630637 |
| <u>85589</u> | <u>75562</u> | <u>90091</u> |
| 907.243 | \$80.09,5 | 96.397 |
| <u>1.06</u> | | <u>1.07</u> |
| 5443458 | | 674779 |
| <u>907243</u> | | <u>96397</u> |
| 961.677 | 103.144 | |
| <u>761.75</u> | <u>1.07</u> | |
| \$199.92 | 722008 | |
| | <u>103144</u> | |
| | \$110.36,4 | |

5.

$$\begin{array}{r}
 \$128 \\
 1.06 \\
 \hline
 768 \\
 128 \\
 \hline
 135.68 \\
 1.06 \\
 \hline
 814.08 \\
 135.68 \\
 \hline
 143.82 \\
 1.06 \\
 \hline
 862.92 \\
 143.82 \\
 \hline
 152.449 \\
 1.028 \\
 \hline
 1219.592 \\
 304.898 \\
 \hline
 1524.49 \\
 \hline
 \$156.71,7572
 \end{array}$$

6.

$$\begin{array}{r}
 \$76.18 \\
 1.06 \\
 \hline
 457.08 \\
 76.18 \\
 \hline
 80.7508 \\
 1.06 \\
 \hline
 4845.048 \\
 807.508 \\
 \hline
 85.595 \\
 1.041\frac{1}{2} \\
 \hline
 85.595 \\
 3423.80 \\
 85.595 \\
 \hline
 427.97 \\
 \hline
 89,14,7192 \\
 76.18 \\
 \hline
 \$12.96
 \end{array}$$

Section 41. (p. 136.)

EQUATION OF PAYMENTS.

4.

The times of payment having been added to the bills, they will become due as follows :

| | | |
|----------|-------------|-----------------|
| \$375.60 | will be due | May 7, 1841. |
| 687.25 | do. | Aug. 18, 1841. |
| 568.50 | do. | Dec. 7, 1841. |
| 300.00 | do. | March 25, 1842. |
| 675.75 | do. | Aug. 5, 1842. |
| 100.00 | do. | March 1, 1842. |

FORM OF STATEMENT.

| | | | | | |
|-----------|---|---------|-----------|------------|----------|
| \$375.60 | × | 0 | | | May 25 |
| 687.25 | × | 103 | = | 70786.75 | June 30 |
| 568.50 | × | 214 | = | 121659.00 | July 31 |
| 300.00 | × | 322 | = | 96600.00 | Aug. 31 |
| 675.75 | × | 455 | = | 307466.25 | Sept. 30 |
| 100.00 | × | 298 | = | 29800.00 | Oct. 31 |
| \$2706.90 | | 270690) | 626312.00 | (231½ + | Nov. 30 |
| | | | | 208 | 208 |
| | | | | Dec. 23½ + | |

The equated time, therefore, will be Dec. 24, 1841. The remainder being more than 23, it must be the 24th day. In performing this question, we have taken the exact number of days in each bill from May 7, 1841. Merchants usually consider a month from any given day in a month to a corresponding one in the next month, whether the time be 30 or 31 days.

Section 42. (p. 139.)

PROPORTION.

4. 4lb. : 87lb. :: \$.36 : \$7.83 Ans.
5. 63gal. : 9gal. :: \$14.49 : \$2.07 Ans.
6. 19A. : 97A. :: \$337.25 : \$1721.75 Ans.
7. 11da. : 47da. :: 319 miles : 1363 miles, Ans.
8. 4lb. : 48lb. :: 7lb. : 84lb. Ans.
9. \$5437.50 : \$7687.50 :: 87 tons : 123 tons, Ans.
10. 15bar. : 79bar. :: \$120 : \$632 Ans.
11. 3 days : 12 days :: 9 horses : 36 horses, Ans.
12. 7gal. : 27gal. :: \$5.88 : \$22.68 Ans.
13. 9lb. : 147lb. :: \$10.80 : \$176.40 Ans.
14. 9 tons : 27 tons :: \$85.95 : \$257.85 Ans.
15. 15 tons : 765 tons :: \$105 : \$5355 Ans.
16. 16hhd. : 176hhd. :: \$320 : \$3520 Ans.

17.

15 cwt. 3qr. 17lb. : 76 cwt. 2qr. 19lb. :: \$124.67°

$$\begin{array}{r}
 4 \\
 \hline
 63 \\
 28 \\
 \hline
 511 \\
 127 \\
 \hline
 1781 \\
 \\
 4 \\
 \hline
 306 \\
 28 \\
 \hline
 2457 \\
 613 \\
 \hline
 8587 \\
 12467 \\
 \hline
 60109 \\
 51522 \\
 \hline
 34348 \\
 17174 \\
 \hline
 8587
 \end{array}$$

1781)1070541.29 (\$601.09 Ans.
10686

$$\begin{array}{r}
 1941 \\
 1781 \\
 \hline
 16029 \\
 16029
 \end{array}$$

18.

7s. 6d. : £76. 19s. 11d. :: \$1

$$\begin{array}{r}
 12 \\
 90 \\
 \hline
 20 \\
 1539 \\
 12
 \end{array}$$

90)18479 (\$205.32½ Ans.
180

$$\begin{array}{r}
 479 \\
 450 \\
 \hline
 290 \\
 270 \\
 \hline
 200 \\
 180 \\
 \hline
 20
 \end{array}$$

19. 8s. : £19. 19s. 8d. :: \$1

$$\begin{array}{r}
 12 \quad 20 \\
 \hline
 96 \quad 399 \\
 12 \\
 96) 4796 (\$49.95 + \text{Ans.} \\
 384 \\
 \hline
 956 \\
 864 \\
 \hline
 920 \\
 864 \\
 \hline
 560 \\
 480
 \end{array}$$

20. 4s. 8d. : £176. 18s. 4d. :: \$1

$$\begin{array}{r}
 12 \quad 20 \\
 \hline
 56 \quad 3538 \\
 12 \\
 56) 42460 (\$758.21 + \text{Ans.} \\
 392 \\
 \hline
 326 \\
 280 \\
 \hline
 460 \\
 448 \\
 \hline
 120 \\
 112 \\
 \hline
 80 \\
 56
 \end{array}$$

21. 4s. 6d. : £769. 18s. 9d. :: \$1

$$\begin{array}{r}
 12 \quad 20 \\
 \hline
 54 \quad 15398 \\
 12 \\
 54) 184785 (\$3421.94 + \text{Ans.} \\
 162 \\
 \hline
 227 \\
 216 \\
 \hline
 118 \\
 108 \\
 \hline
 105 \\
 \text{(Carried up.)}
 \end{array}$$

$$\begin{array}{r}
 \text{(Brought up.)} \\
 105 \\
 54 \\
 \hline
 510 \\
 486 \\
 \hline
 240 \\
 216
 \end{array}$$

22.

$$\begin{array}{r}
 1m. : 32m. :: 2m. 8sec. \\
 \begin{array}{r}
 128 \\
 \hline
 256 \\
 64 \\
 \hline
 32
 \end{array}
 \quad
 \begin{array}{r}
 60 \\
 \hline
 128
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 60 \overline{) 4096} \\
 60 \overline{) 68} \quad 16sec. \\
 \hline
 1h. 8m. 16sec. \text{ Ans.}
 \end{array}$$

23.

$$\begin{array}{r}
 1A. : 144A. 3R. 17p. :: \$37.86 \\
 \begin{array}{r}
 4 \quad \quad 4 \\
 \hline
 4 \quad 579 \\
 40 \quad 40 \\
 \hline
 160 \quad 23177 \\
 \quad 3786 \\
 \hline
 \quad 139062 \\
 \quad 185416 \\
 \quad 162239 \\
 \quad 69531 \\
 \hline
 160 \overline{) 877481.22} (\$5484.25 + \text{Ans.} \\
 \quad 800 \\
 \hline
 \quad 774 \\
 \quad 640 \\
 \hline
 \quad 1348 \\
 \quad 1280 \\
 \hline
 \quad 681 \\
 \quad 640 \\
 \hline
 \quad 412 \\
 \quad 320 \\
 \hline
 \quad 922 \\
 \quad 800
 \end{array}
 \end{array}$$

24.

$$\begin{array}{r}
 1\text{h.} : 9\text{h. } 45\text{m. } 19\text{sec.} :: 3\text{m. } 7\text{fur. } 18\text{rd.} \\
 \hline
 60 \quad 60 \quad 8 \\
 \hline
 60 \quad 585 \quad 31 \\
 \hline
 60 \quad 60 \quad 40 \\
 \hline
 3600 \quad 35119 \quad 1258 \\
 \hline
 \quad \quad 1258 \\
 \hline
 \quad \quad 280952 \\
 \hline
 \quad \quad 175595 \\
 \hline
 \quad \quad 70238 \\
 \hline
 \quad \quad 35119 \\
 \hline
 3600) 44179702 \\
 \hline
 \quad 40) 12272 \text{ } + \text{rd.} \\
 \hline
 \quad \quad 8) 306 \text{ } 32\text{rd.} \\
 \hline
 \quad \quad \quad 38\text{m. } 2\text{fur. } 32 \text{ } + \text{rd. Ans.}
 \end{array}$$

25. $21 - 15 = 6\text{rd.} : 21\text{rd.} :: 96\text{rd.} : 336\text{rd. Ans.}$

26. $4 + 5 = 9 \text{ men} : 5 \text{ men} :: 12\text{h.} : 6\frac{2}{3}\text{h. Ans.}$

27. $10 - 3 = 7 \text{ men} : 10 \text{ men} :: 63\text{da.} : 90\text{da. Ans.}$

28. $\$7.50 : \$5.00 :: 5\text{oz.} : 3\frac{1}{2}\text{oz. Ans.}$

29. $13\text{h.} : 14\text{h.} :: 10\text{da.} : 10\frac{1}{2}\text{da. Ans.}$

30. $40\text{lb.} : 79\text{lb.} :: 29\text{lb.} : 57\frac{1}{2}\text{lb. Ans.}$

34. $11\frac{1}{2}\text{yd.} : 100\text{yd.} :: 4\frac{1}{2}\text{yd.} = \frac{9}{2} : \frac{100}{9} :: \frac{4}{9} = \frac{4}{9}$
 $\times \frac{100}{9} \times \frac{4}{9} = \frac{25}{81} \times 100 = 30\frac{1}{81}\text{yds. Ans.}$

35. $5\frac{1}{2}\text{cwt.} : 25\frac{1}{2}\text{cwt.} :: 14\frac{1}{2} \text{ E. E.} = \frac{11}{2} : \frac{25}{2} :: \frac{11}{2}$

$\text{E. E.} = \frac{11}{2} \times \frac{5}{1} \times \frac{1}{4} = \frac{55}{8}\text{qu.} = \frac{11}{61} \times \frac{282}{11} \times \frac{55}{32} =$

$\frac{16775}{1952} = 85\text{yd. } 3\text{qr. } 3\frac{1}{2}\text{na. Ans.}$

36. $48\text{da.} : 36\text{da.} :: 144 \text{ men} : 108 \text{ men} ; 144 - 108$
 $= 36 \text{ men, Ans.}$

37. $\begin{array}{cc} \text{d.} & \text{d.} \\ 6 : 1 :: 1 : \frac{1}{6} \end{array}$ the part James will do in one day.

$\begin{array}{cc} \text{w.} & \text{w.} \\ 8 : 1 :: 1 : \frac{1}{8} \end{array}$ the part John will do in one day.

$\frac{1}{6} + \frac{1}{8} = \frac{7}{24}$ the part James and John will do in one day.

$\frac{7}{24}\text{w.} : 1\text{w.} :: 1\text{da.} : 3\frac{3}{4}\text{da. Ans.}$

38. 9h. : 1h. :: 1w. : $\frac{1}{9}$ w. = part Samuel will do in one day.

4h. : 1h. :: 1w. : $\frac{1}{4}$ w. = part Samuel and Alfred will do in one day.

$\frac{1}{4} - \frac{1}{9} = \frac{5}{36}$ = part Alfred will do in one day.

$\frac{5}{36}$ w. : 1w. :: 1 hour : $7\frac{1}{3}$ hours, Ans.

39. 10da. : 1da. :: 1w. : $\frac{1}{10}$ w. = part Atwood would do in a day.

7da. : 1da. :: 1w. : $\frac{1}{7}$ w. = part Jerry and his father would do in a day.

6da. : 1da. :: 1w. : $\frac{1}{6}$ w. = part Jacob and his father would do in a day.

$\frac{1}{7} - \frac{1}{10} = \frac{3}{70}$ = part Jerry would do in a day.

$\frac{1}{6} - \frac{1}{10} = \frac{1}{15}$ = part Jacob would do in a day.

$\frac{3}{70} + \frac{1}{15} = \frac{23}{210}$ = part Jerry and Jacob would do in a day.

$\frac{23}{210}$ w. : 1w. :: 1da. : $9\frac{2}{3}$ days, Ans.

41. $\$5.00 \times 40 = \200.00 , price given for the cloth ;
 $\$1.00 : \$1.15 :: \$200.00 : \230.00 Ans.

42. $\$1.00 : \$0.70 :: \$175.00 : \122.50 Ans.

43. $\$6.00 - \$5.00 = \$1.00$; $\$5.00 : \$1.00 :: \$100$
 : 20 per cent., Ans.

44. $\$15.00 - \$12.00 = \$3.00$; $\$15.00 : \$3.00 ::$
 $\$100$; 20 per cent., Ans.

45. $\frac{128}{100} - \frac{20}{100} = \frac{108}{100} : \frac{20}{100} :: \$60 : \$120$ Ans.

46. $\$0.25 : \$27.50 :: 1\text{gal.} : 110\text{ gallons, Ans.}$

47. $\$15.75 : \$1728 :: 1A. : 109A. 2R. 34\frac{1}{2}p.$ Ans.

Section 43. (p. 144.)

COMPOUND PROPORTION.

2.

$$\begin{array}{l} \$800 : \$100 \\ \$6 : \$32 \end{array} \} :: 12 \text{ months} : 8 \text{ months, Ans.}$$

OPERATION.

$$\frac{100 \times 32 \times 12}{800 \times 6} = 8 \text{ months, Ans.}$$

3.

$$\begin{array}{l} \$6 : \$32 \\ 8\text{mo.} : 12\text{mo.} \end{array} \} :: \$100 : \$800 \text{ Ans.}$$

4.

$$\begin{array}{l} \$800 : \$100 \\ 8\text{mo.} : 12\text{mo.} \end{array} \} :: \$32 : \$6 \text{ Ans.}$$

5.

$$\begin{array}{l} 20 \text{ men} : 15 \text{ men} \\ 10 \text{ hours} : 15 \text{ hours} \end{array} \} :: 60 \text{ days} : 67\frac{1}{2} \text{ days, Ans}$$

6.

$$\begin{array}{l} 351\text{bu.} : 1404\text{bu.} \\ 2\text{w.} : 3\text{w.} \end{array} \} :: 939 \text{ men} : 5634 \text{ men, Ans}$$

7.

$$\begin{array}{l} 24 \text{ men} : 248 \text{ men} \\ 9 \text{ hours} : 11 \text{ hours} \\ 7 \text{ hard.} : 4 \text{ hard.} \\ 232\frac{1}{2} \text{ feet} : 337\frac{1}{2} \text{ feet} \\ 3\frac{3}{4} \text{ feet} : 5\frac{3}{4} \text{ feet} \\ 2\frac{1}{2} \text{ feet} : 3\frac{1}{2} \text{ feet} \end{array} \} :: 5\frac{1}{2} \text{ days} : 132 \text{ days, Ans.}$$

Section 44. (p. 145.)

COMPANY BUSINESS.

2.

| | | |
|--------------------|-------------------------------------|-----------------------|
| A.'s stock \$ 6000 | $\frac{6000}{20000} = \frac{3}{10}$ | A.'s fractional part. |
| B.'s stock \$ 9000 | $\frac{9000}{20000} = \frac{9}{20}$ | B.'s fractional part. |
| C.'s stock \$ 5000 | $\frac{5000}{20000} = \frac{1}{4}$ | C.'s fractional part. |
| <u>\$ 20000</u> | | |

| | | |
|-----------------|-----------------|---------------|
| \$ 840 | \$ 840 | \$ 840 |
| 3 | 9 | 1 |
| 10) <u>2520</u> | 20) <u>7560</u> | 4) <u>840</u> |
| \$ 252 | \$ 378 | \$ 210 |
| A.'s gain. | B.'s gain. | C.'s gain. |

F

3.

| | | |
|-----------------|---|----------------|
| Parker \$ 8750 | $\frac{8750}{19360} = \frac{875}{1936}$ | Parker's part. |
| Dole \$ 3610 | $\frac{3610}{19360} = \frac{361}{1936}$ | Dole's part. |
| Gage \$ 7000 | $\frac{7000}{19360} = \frac{700}{1936}$ | Gage's part. |
| <u>\$ 19360</u> | | |

$$\$ 6875 - \$ 375 = \$ 6500$$

$$\frac{\$ 6500 \times 875}{1936} = \$ 2937.75\frac{125}{121} = \text{Parker's dividend.}$$

$$\frac{\$ 6500 \times 361}{1936} = \$ 1212.03\frac{82}{121} = \text{Dole's dividend.}$$

$$\frac{\$ 6500 \times 700}{1936} = \$ 2350.20\frac{50}{121} = \text{Gage's dividend.}$$

4.

| | | |
|------------------|---------------------------------------|-----------------------|
| A.'s debt \$ 500 | $\frac{500}{2000} = \frac{1}{4}$ | A.'s fractional part. |
| B.'s do. \$ 386 | $\frac{386}{2000} = \frac{193}{1000}$ | B.'s fractional part. |
| C.'s do. \$ 988 | $\frac{988}{2000} = \frac{247}{500}$ | C.'s fractional part. |
| D.'s do. \$ 126 | $\frac{126}{2000} = \frac{63}{1000}$ | D.'s fractional part. |
| <u>\$ 2000</u> | | |

$$\frac{\$ 100 \times 1}{4} = \$ 25.00 \text{ A.'s part.}$$

$$\frac{\$ 100 \times 193}{1000} = \$ 19.30 \text{ B.'s part.}$$

$$\frac{\$ 100 \times 247}{500} = \$ 49.40 \text{ C.'s part.}$$

$$\frac{\$ 100 \times 63}{1000} = \$ 6.30 \text{ D.'s part.}$$

Section 45. (p. 147.)

DOUBLE FELLOWSHIP.

2.

$$\$ 700 \times 5 = 3500 \quad \frac{3500}{13300} = \frac{35}{133} \text{ A.'s fraction.}$$

$$\$ 800 \times 6 = 4800 \quad \frac{4800}{13300} = \frac{48}{133} \text{ B.'s fraction.}$$

$$\$ 500 \times 10 = 5000 \quad \frac{5000}{13300} = \frac{50}{133} \text{ C.'s fraction.}$$

$$\underline{\$ 13300}$$

$$\frac{\$ 399 \times 35}{133} = \$ 105 \text{ A.'s gain.}$$

$$\frac{\$ 399 \times 48}{133} = \$ 144 \text{ B.'s gain.}$$

$$\frac{\$ 399 \times 50}{133} = \$ 150 \text{ C.'s gain.}$$

3.

$$\text{Johnson's stock } \$ 1000 \times 6 = 6000$$

$$\underline{500}$$

$$\frac{6000}{11000} = \frac{6}{11} \text{ Johnson}$$

$$\$ 1500 \times 6 = 9000$$

$$\underline{\$ 15000}$$

$$\text{Hyde's stock } \$ 800 \times 4 = 3200$$

$$\underline{400}$$

$$\frac{\$ 1200 \times 6}{500} = 7200 \quad \frac{12000}{11000} = \frac{12}{11} \text{ Hyde}$$

$$\underline{500}$$

$$\$ 700 \times 2 = 1400$$

$$\underline{\$ 11800}$$

Tyler's stock $\$1200 \times 7 = 8400$ $\frac{13188}{431} = \frac{131}{431}$ Tyler.

$$\begin{array}{r} \$1500 \times 3 = 4500 \\ 200 \\ \$1700 \times 2 = 3400 \\ \hline \$16300 \end{array} \quad \begin{array}{r} \$15000 \\ 11800 \\ 16300 \\ \hline \$43100 \end{array}$$

$$\frac{\$1000 \times 150}{431} = \$348.02\frac{338}{431} \text{ Johnson's gain.}$$

$$\frac{\$1000 \times 118}{431} = \$273.78\frac{82}{431} \text{ Hyde's gain.}$$

$$\frac{\$1000 \times 163}{431} = \$378.19\frac{11}{431} \text{ Tyler's gain.}$$

4.

The stock in trade is a horse and chaise to ride to Newburyport and back ; the whole distance being 30 miles. The expense for the horse and chaise may be considered the "loss"; and the proportional part which each rode, the "time." Now, by the rule, each man is to bear his share of the loss (expense) in proportion as he has the use of the stock in trade (horse and chaise). Morse had the use of the whole stock in trade for the first 4 and last 4 miles, for which he must pay $\frac{8}{30} = \frac{4}{15}$ of $\$3.00 = \0.80 . For the remaining part of the distance, 22 miles, the expense was $\frac{22}{30} = \frac{11}{15}$ of $\$3.00 = \2.20 . Of this sum, Jones and Morse will pay equal parts $= \$2.20 \div 2 = \1.10 . Morse will therefore pay $\$0.80 + \$1.10 = \$1.90$, and Jones $\$1.10$.

OPERATION.

$$\frac{4}{15} + \frac{11}{15} \times \frac{1}{2} = \frac{19}{30} = \text{Morse's product.}$$

$$\frac{11}{15} \times \frac{1}{2} = \frac{11}{30} = \text{Jones's product.}$$

$$\frac{30}{30} = \text{sum of the products.}$$

$$18 : 18 :: \$3.00$$

19

2700

300

$$30 \overline{) 5700} (\$1.90 = \text{Morse's share of the expense.}$$

30

270

270

0

$$18 : 18 :: \$3.00$$

11

$$30 \overline{) 3300} (\$1.10 = \text{Jones's share of the expense.}$$

30

30

30

0

5.

As Jones's capital was invested 12 months and Cotton's but 9 months, Cotton's capital must be $\frac{12}{9}$ of Jones's capital.

$$9 \text{ months} : 12 \text{ months} :: \$1000 : \$1333.33\frac{1}{3} \text{ Ans.}$$

Section 46. (p. 148.)

DUODECIMALS.

2.

| ft. | in. |
|-------|------|
| 8 | 3 |
| 7 | 9 |
| <hr/> | |
| 57 | 9 |
| 6 | 2 3 |
| 63 | 11 3 |

3.

| ft. | |
|-------|-----|
| 12 | 9 |
| 9 | 11 |
| <hr/> | |
| 114 | 9 |
| 11 | 8 3 |
| 126 | 5 3 |

4.

| ft. | ' | " |
|-------|----|--------|
| 14 | 9 | 11 |
| 6 | 11 | 8 |
| <hr/> | | |
| 88 | 11 | 6 |
| 13 | 7 | 1 1 |
| <hr/> | | |
| | 9 | 10 7 4 |
| 103 | 4 | 5 8 4 |

5.

| ft. | ' | " |
|-------|----|---|
| 161 | 8 | 6 |
| 7 | 10 | |
| <hr/> | | |
| 1131 | 11 | 6 |
| 134 | 9 | 1 |
| <hr/> | | |
| 1266 | 8 | 7 |

6.

| ft. | ' | " |
|-------|----|-------|
| 87 | 1 | 11 |
| 5 | 7 | 5 |
| <hr/> | | |
| 435 | 9 | 7 |
| 50 | 10 | 1 5 |
| 3 | 0 | 3 9 7 |
| <hr/> | | |
| 489 | 8 | 0 2 7 |

7.

| ft. | ' | " |
|-------|----|---|
| 18 | | |
| 1 | 10 | |
| <hr/> | | |
| 18 | | |
| 15 | | 0 |
| <hr/> | | |
| 33 | | 0 |

8.

| ft. | in. |
|-------|-----|
| 19 | 8 |
| 2 | 11 |
| <hr/> | |
| 39 | 4 |
| 18 | 0 4 |
| <hr/> | |
| 57 | 4 4 |

9.

| ft. | in. |
|-------|------|
| 18 | 9 |
| 10 | 6 |
| <hr/> | |
| 187 | 6 |
| 9 | 4 6 |
| <hr/> | |
| 196 | 10 6 |

10.

| ft. | in. |
|-------|------|
| 14 | 9 |
| 12 | 6 |
| <hr/> | |
| 27 | 3 |
| | 2 |
| <hr/> | |
| 54 | 6 |
| 7 | 9 |
| <hr/> | |
| 381 | 6 |
| 40 | 10 6 |
| <hr/> | |
| 422 | 4 6 |

| ft. | in. |
|-------|-----|
| 14 | 9 |
| 12 | 6 |
| <hr/> | |
| 177 | 0 |
| 7 | 4 6 |
| <hr/> | |
| 184 | 4 6 |
| | 2 |
| <hr/> | |
| 368 | 9 0 |
| 422 | 4 6 |
| <hr/> | |
| 791 | 1 6 |

[Ans.

11.

| ft. | in. |
|-------|-----|
| 3 | 8 |
| 1 | 9 |
| <hr/> | |
| 3 | 8 |
| 2 | 9 |
| <hr/> | |
| 6 | 5 |
| | 2 |
| <hr/> | |
| 12 | 10 |
| 7 | 4 |
| 3 | 2 |
| <hr/> | |
| 23 | 4 |
| | 12 |
| <hr/> | |

280 0 Ans.

| ft. | in. |
|-------|-----|
| 1 | 2 |
| | 2 |
| <hr/> | |
| 1 | 0 |
| 3 | 8 |
| <hr/> | |
| 3 | 0 |
| | 8 |
| <hr/> | |
| 3 | 8 |
| | 2 |
| <hr/> | |
| 7 | 4 |

| ft. | in. |
|-------|-----|
| 1 | 9 |
| | 2 |
| <hr/> | |
| 1 | 7 |
| 1 | 0 |
| <hr/> | |
| 1 | 7 |
| | 2 |
| <hr/> | |
| 3 | 2 |

| ft. | in. |
|-------|-----|
| 3 | 8 |
| | 2 |
| <hr/> | |
| 3 | 6 |
| 1 | 7 |
| <hr/> | |
| 3 | 6 |
| 2 | 0 6 |
| <hr/> | |
| 5 | 6 6 |
| 1 | 0 |
| <hr/> | |
| 5 | 6 6 |
| | 12 |
| <hr/> | |

66 6 0 =

[66 feet 66in.]

12.

$$\begin{array}{r}
 \text{rods.} \\
 18 \\
 10 \\
 \hline
 28 \\
 2 \\
 \hline
 56 \\
 16\frac{1}{2} \\
 \hline
 336 \\
 56 \\
 28 \\
 \hline
 924 \\
 4 \times 2 = 8 \\
 \hline
 932 \\
 3 \\
 \hline
 2796 \\
 2 \\
 \hline
 5592
 \end{array}$$

$$3\frac{1}{2} \times 4 = 14$$

$$\begin{array}{r}
 \text{ft.} \\
 924 \\
 \hline
 938 \\
 4 \\
 \hline
 3752 \\
 3\frac{1}{2} \\
 \hline
 11256 \\
 1876 \\
 \hline
 13132 \\
 5592 \\
 \hline
 7540 \text{ Ans.}
 \end{array}$$

13.

$$\begin{array}{r}
 \text{ft.} \\
 56 \\
 5 \ 6 \\
 \hline
 280 \\
 28 \\
 \hline
 32 \overline{)308} (9\frac{1}{2} \text{ cor} \\
 288 \\
 \hline
 20
 \end{array}$$

14.

$$\begin{array}{r}
 \text{ft.} \quad \text{in.} \\
 23 \ 8 \\
 3 \ 9 \\
 \hline
 71 \ 0 \\
 17 \ 9 \\
 \hline
 32 \overline{)88} \ 9 (2\frac{22}{128} \text{ cords,} \\
 12 \ 64 \quad \quad \quad \text{[Ans.} \\
 \hline
 384 \ 24 \\
 12 \\
 \hline
 297 \\
 3 \overline{)384} = 12\frac{2}{3}
 \end{array}$$

15.

$$\begin{array}{r}
 \text{ft.} \\
 97 \\
 7 \\
 \hline
 679 \\
 3 \ 8 \\
 \hline
 2037 \\
 452 \ 8 \\
 \hline
 128 \overline{)2489} \ 8 (19 \text{ cords } 3\frac{1}{8} \\
 128 \\
 \hline
 1209 \\
 1152 \\
 \hline
 16 \overline{)57} (3 \\
 12 \ 48 \\
 \hline
 192 \ 9 \\
 12 \\
 \hline
 116 \\
 192 = 2\frac{2}{3}
 \end{array}$$

16.

$$\begin{array}{r}
 \text{ft.} \quad \text{in.} \\
 8 \ 9 \\
 8 \\
 \hline
 30 \ 0
 \end{array}
 \quad
 \begin{array}{r}
 30 \overline{)128} (4\frac{4}{15} \text{ feet, Ans.} \\
 120 \\
 \hline
 8
 \end{array}$$

$$\begin{array}{r}
 \text{ft. in.} \\
 1 \quad 7 \\
 12 \\
 \hline
 19
 \end{array}
 \quad
 \begin{array}{r}
 17. \\
 20 \\
 12 \\
 \hline
 19 \overline{)240} (12 \text{ feet } 7\frac{1}{2} \text{ in. Ans.} \\
 19 \\
 \hline
 50 \\
 38 \\
 \hline
 12 \\
 12 \\
 \hline
 19 \overline{)144} (7\frac{1}{2} \text{ in.} \\
 133 \\
 \hline
 11
 \end{array}$$

$$\begin{array}{r}
 \text{ft. in.} \\
 19 \quad 7 \\
 12 \\
 \hline
 235
 \end{array}
 \quad
 \begin{array}{r}
 \text{in.} \\
 144 \\
 9 \\
 \hline
 235 \overline{)1296} (5\frac{1}{2} \text{ in. Ans.} \\
 1175 \\
 \hline
 121
 \end{array}$$

$$\begin{array}{r}
 19. \\
 \text{ft. in.} \\
 19 \quad 8 \\
 14 \quad 6 \\
 \hline
 275 \quad 4 \\
 9 \quad 10 \\
 \hline
 285 \quad 2 \\
 7 \quad 6 \\
 \hline
 1996 \quad 2 \\
 142 \quad 7 \\
 \hline
 128 \overline{)2138} \quad 9 (16 \text{ cords.} \\
 128 \\
 \hline
 858 \\
 768 \\
 \hline
 16 \overline{)90} (5\frac{1}{2} \text{ feet.} \\
 12 \quad 80 \\
 \hline
 192 \quad 10 \\
 12 \\
 \hline
 129 \\
 \hline
 192 = 1\frac{1}{2}
 \end{array}
 \quad
 \begin{array}{r}
 20. \\
 \text{ft. in.} \quad \text{ft. in.} \\
 12 \quad 6 \quad 6 \quad 5 \quad 6 \quad 12 \\
 11 \quad 2 \quad 6 \quad 3 \quad 6 \quad 11 \\
 \hline
 23 \quad 13 \quad 0 \quad 16 \quad 6 \quad 23 \\
 2 \quad 3 \quad 3 \quad 2 \quad 9 \quad 2 \\
 \hline
 46 \quad 16 \quad 3 \quad 19 \quad 3 \quad 46 \\
 7\frac{1}{2} \quad 2 \quad 3 \quad 5 \\
 \hline
 322 \quad 32 \quad 6 \quad 57 \quad 9 \quad 41 \quad 0 \\
 23 \quad 32 \quad 6 \quad 8 \\
 \hline
 9 \overline{)345} \quad 9 \overline{)117} \quad 7 \\
 38\frac{1}{2} \quad 13\frac{7}{108} \quad 13\frac{7}{108} \\
 \hline
 25\frac{29}{108} \text{ yards, Ans.}
 \end{array}$$

Section 48. (p. 154.)**EXTRACTION OF THE SQUARE ROOT.****3.**

$$\begin{array}{r}
 23804641(4879 \\
 16 \\
 88)780 \\
 704 \\
 967)7646 \\
 6769 \\
 9749)87741 \\
 87741 \\
 \hline
 \end{array}$$

4.

$$\begin{array}{r}
 10673289(3267 \\
 9 \\
 62)167 \\
 124 \\
 646)4332 \\
 3876 \\
 6527)45689 \\
 45689 \\
 \hline
 \end{array}$$

5.

$$\begin{array}{r}
 20894041(4571 \\
 16 \\
 85)489 \\
 425 \\
 907)6440 \\
 6349 \\
 9141)9141 \\
 9141 \\
 \hline
 \end{array}$$

6.

$$\begin{array}{r}
 1014049(1007 \\
 1 \\
 2007)014049 \\
 014049 \\
 \hline
 \end{array}$$

7.

$$\begin{array}{r}
 516961(719 \\
 49 \\
 141)269 \\
 141 \\
 1429)12861 \\
 12861 \\
 \hline
 \end{array}$$

8.

$$\begin{array}{r}
 182329(427 \\
 16 \\
 82)223 \\
 164 \\
 847)5929 \\
 5929 \\
 \hline
 \end{array}$$

9.

$$\begin{array}{r} 61723020.96(7856.4 \\ 49 \\ 148 \overline{)1272} \\ 1184 \\ 1565 \overline{)8830} \\ 7925 \\ 15706 \overline{)100520} \\ 94236 \\ 157124 \overline{)628496} \\ 628496 \end{array}$$

10.

$$\begin{array}{r} 9754.60423716(98.7654 \\ '81 \\ 188 \overline{)1654} \\ 1504 \\ 1967 \overline{)15060} \\ 13769 \\ 19746 \overline{)129142} \\ 118476 \\ 197525 \overline{)1066637} \\ 987625 \\ 1975304 \overline{)7901216} \\ 7901216 \end{array}$$

11.

$$\begin{array}{r} \sqrt{7111} \\ 3721(61 \\ 36 \\ 121 \overline{)121} \\ 121 \\ 7569(87 \\ 64 \\ 167 \overline{)1169} \\ 1169 \\ \frac{8}{7} \text{ Ans.} \end{array}$$

12.

$$\begin{array}{r} \sqrt{12769} \\ 1849(43 \\ 16 \\ 83 \overline{)249} \\ 249 \\ 12769(113 \\ 1 \\ 21 \overline{)27} \\ 21 \\ 223 \overline{)669} \\ 669 \\ \frac{43}{113} \text{ Ans.} \end{array}$$

13.

$$\begin{array}{r} \sqrt{49} \\ 49(7 \\ 49 \\ 529(23 \\ 4 \\ 43 \overline{)129} \\ 129 \\ \frac{7}{23} \text{ Ans.} \end{array}$$

14.

$$\begin{array}{r} \sqrt{196} \\ 196(14 \\ 1 \\ 24 \overline{)96} \\ 96 \\ 625(25 \\ 4 \\ 45 \overline{)225} \\ 225 \\ \frac{14}{25} \text{ Ans.} \end{array}$$

15.

$$\begin{array}{r} 60\frac{1}{18} = 3\frac{2}{3} \\ 961(31 \\ 9 \\ 61 \overline{)61} \\ 61 \\ 16(4 \\ 16 \\ 41 = 7\frac{2}{3} \text{ Ans.} \end{array}$$

16.

$$\begin{array}{r} 28\frac{7}{8} = 3\frac{5}{8} \\ 1849(43 \\ 16 \\ 83 \overline{)249} \\ 249 \\ 64(8 \\ 64 \\ 48 = 5\frac{3}{8} \text{ Ans.} \end{array}$$

17.

$$\begin{array}{r} 47\frac{1}{4} = 30\frac{3}{4} \\ 3025(55 \\ 25 \\ 105 \overline{)525} \\ 525 \\ 64(8 \\ 64 \\ 58 = 6\frac{1}{2} \text{ Ans.} \end{array}$$

18.

$$\begin{array}{r} 2355\dot{6} / 476 \\ 16 \\ \hline 57 \overline{) 665} \\ 609 \\ \hline 946 \overline{) 5676} \\ 5676 \\ \hline \end{array}$$

19.

$$\begin{array}{r} 40 \quad 9 \\ 40 \quad 9 \\ \hline 1600 \quad 81 \\ 81 \\ \hline 1681 (41 \text{ Ans.} \\ 16 \\ \hline 81 \overline{) 81} \\ 81 \\ \hline \end{array}$$

20.

$$\begin{array}{r} 360 \quad 450 \\ 360 \quad 450 \\ \hline 21600 \quad 22500 \\ 108 \quad 180 \\ \hline 129600 \quad 202500 \\ 202500 \\ \hline 332100 (576.2 + \text{ miles,} \\ 25 \quad \quad \quad \text{[Ans.} \end{array}$$

21.

$$3^2 = 9 : 2^2 = 4 :: 20\frac{1}{4}$$

$$\begin{array}{r} 9 \overline{) 81} (9 \text{ min.} \\ 81 \quad \text{[Ans.} \\ \hline \end{array}$$

$$\begin{array}{r} 107 \overline{) 921} \\ 749 \\ \hline 1146 \overline{) 7200} \\ 6876 \\ \hline 11522 \overline{) 32400} \\ 23044 \\ \hline \end{array}$$

22.

$$2000 \text{ lb.} : 4000 \text{ lb.} :: 3^2 = 9$$

$$\begin{array}{r} 2000 \overline{) 36000} (18 \\ 2000 \\ \hline 16000 \\ 16000 \\ \hline \end{array}$$

$$18 (4.24 + \text{ in. Ans.}$$

$$\begin{array}{r} 82 \overline{) 200} \\ 164 \\ \hline 844 \overline{) 3600} \\ 3376 \\ \hline \end{array}$$

23.

$$\begin{array}{r} 30 \\ 30 \\ \hline 2 \overline{) 900} \\ 450 (21.2 + \text{ in. Ans.} \\ 4 \\ \hline 41 \overline{) 50} \\ 41 \\ \hline 422 \overline{) 900} \\ 844 \\ \hline \end{array}$$

24.

| | | | |
|------------------------|------------------------|-----------------|-------------|
| 60 | 80 | 70 | 90 |
| 60 | 80 | 70 | 90 |
| <u>3600</u> | <u>6400</u> | <u>4900</u> | <u>8100</u> |
| 6400 | | 6400 | |
| <u>10000</u> (100 | <u>11300</u> (106.30 + | <u>8100</u> | |
| 1 | 1 | 4900 | |
| 200)0000 | 206)1300 | 13000(114.01 + | |
| | 1236 | 1 | |
| | 2123)6400 | 21)30 | |
| 8100 | 6369 | 21 | |
| <u>3600</u> | <u>21260</u>)3100 | <u>224</u>)900 | |
| <u>11700</u> (108.16 + | | 896 | |
| 1 | | 22801)40000 | |
| 208)1700 | | <u>22801</u> | |
| 1664 | 100. | | |
| 2161)3600 | 106.30 + | | |
| 2161 | 114.01 + | | |
| 21626)143900 | 108.16 + | | |
| <u>129756</u> | <u>428.47 + Ans.</u> | | |

Section 49. (p. 158.)

EXTRACTION OF THE CUBE ROOT.

2.

| | |
|--------------|--------------------------------|
| 74088(42 | $4 \times 4 \times 300 = 4800$ |
| 64 | $4 \times 30 = 120$ |
| 4920)10088 | First divisor. = 4920 |
| <u>9600</u> | |
| 480 | $4800 \times 2 = 9600$ |
| 8 | $120 \times 2 \times 2 = 480$ |
| <u>10088</u> | $2 \times 2 \times 2 = 8$ |
| | <u>10088</u> |

3.

$$\begin{array}{r}
 185193(57 \\
 125 \\
 7650 \overline{)60193} \\
 \underline{52500} \\
 7350 \\
 \underline{343} \\
 60193
 \end{array}$$

$$\begin{array}{r}
 5 \times 5 \times 300 = 7500 \\
 5 \times 30 = 150 \\
 \hline
 7650 \\
 7500 \times 7 = 52500 \\
 150 \times 7 \times 7 = 7350 \\
 7 \times 7 \times 7 = 343 \\
 \hline
 60193
 \end{array}$$

4.

$$\begin{array}{r}
 80621568(432 \\
 64 \\
 4920 \overline{)16621} \\
 \underline{14400} \\
 1080 \\
 \underline{27} \\
 15507 \\
 555990 \overline{)1114568} \\
 \underline{1109400} \\
 5160 \\
 \underline{8} \\
 1114568
 \end{array}$$

$$\begin{array}{r}
 4 \times 4 \times 300 = 4800 \\
 4 \times 30 = 120 \\
 \hline
 4920 \\
 4800 \times 3 = 14400 \\
 120 \times 3 \times 3 = 1080 \\
 3 \times 3 \times 3 = 27 \\
 \hline
 15507 \\
 43 \times 43 \times 300 = 554700 \\
 43 \times 30 = 1290 \\
 \hline
 555990 \\
 554700 \times 2 = 1109400 \\
 1290 \times 2 \times 2 = 5160 \\
 2 \times 2 \times 2 = 8 \\
 \hline
 1114568
 \end{array}$$

5.

$$\begin{array}{r}
 176558481(561 \\
 125 \\
 7650 \overline{)51558} \\
 \underline{45000} \\
 5400 \\
 \underline{216} \\
 50616 \\
 942480 \overline{)942481} \\
 \underline{940800} \\
 1680 \\
 \underline{1} \\
 942481
 \end{array}$$

$$\begin{array}{r}
 5 \times 5 \times 300 = 7500 \\
 5 \times 30 = 150 \\
 \hline
 7650 \\
 7500 \times 6 = 45000 \\
 150 \times 6 \times 6 = 5400 \\
 6 \times 6 \times 6 = 216 \\
 \hline
 50616 \\
 56 \times 56 \times 300 = 940800 \\
 56 \times 30 = 1680 \\
 \hline
 942480
 \end{array}$$

5. (Continued.)

$$\begin{array}{r} 940800 \times 1 = 940800 \\ 1680 \times 1 \times 1 = 1680 \\ 1 \times 1 \times 1 = 1 \\ \hline 942481 \end{array}$$

6.

$$\begin{array}{r} 257259456(636 \\ 216 \\ \hline 10980)41259 \\ \hline 32400 \\ 1620 \\ 27 \\ \hline 34047 \\ \hline 1192590)7212456 \\ \hline 7144200 \\ 68040 \\ 216 \\ \hline 7212456 \end{array}$$

$$\begin{array}{r} 6 \times 6 \times 300 = 10800 \\ 6 \times 30 = 180 \\ \hline 10980 \end{array}$$

$$\begin{array}{r} 10800 \times 3 = 32400 \\ 180 \times 3 \times 3 = 1620 \\ 3 \times 3 \times 3 = 27 \\ \hline 34047 \end{array}$$

$$\begin{array}{r} 63 \times 63 \times 300 = 1190700 \\ 63 \times 30 = 1890 \\ \hline 1192590 \end{array}$$

$$\begin{array}{r} 1190700 \times 6 = 7144200 \\ 1890 \times 6 \times 6 = 68040 \\ 6 \times 6 \times 6 = 216 \\ \hline 7212456 \end{array}$$

7.

$$\begin{array}{r} 1860867(123 \\ 1 \\ \hline 830)860 \\ \hline 600 \\ 120 \\ 8 \\ \hline 728 \\ \hline 43560)132867 \\ \hline 129600 \\ 3240 \\ 27 \\ \hline 132867 \end{array}$$

$$\begin{array}{r} 1 \times 1 \times 300 = 300 \\ 1 \times 30 = 30 \\ \hline 330 \end{array}$$

$$\begin{array}{r} 300 \times 2 = 600 \\ 30 \times 2 \times 2 = 120 \\ 2 \times 2 \times 2 = 8 \\ \hline 728 \end{array}$$

$$\begin{array}{r} 12 \times 12 \times 300 = 43200 \\ 12 \times 30 = 360 \\ \hline 43560 \end{array}$$

$$\begin{array}{r} 43200 \times 3 = 129600 \\ 360 \times 3 \times 3 = 3240 \\ 3 \times 3 \times 3 = 27 \\ \hline 132867 \end{array}$$

8.

$$\begin{array}{r}
 1879080904(1234 \\
 1 \\
 \hline
 330 \overline{)879} \\
 \underline{600} \\
 120 \\
 8 \\
 \hline
 728 \\
 43560 \overline{)151080} \\
 \underline{129600} \\
 3240 \\
 27 \\
 \hline
 132867 \\
 4542390 \overline{)18213904} \\
 \underline{18154800} \\
 59040 \\
 64 \\
 \hline
 18213904
 \end{array}$$

$$\begin{array}{r}
 1 \times 1 \times 300 = 300 \\
 1 \times 30 = 30 \\
 \hline
 330 \\
 300 \times 2 = 600 \\
 30 \times 2 \times 2 = 120 \\
 2 \times 2 \times 2 = 8 \\
 \hline
 728
 \end{array}$$

$$\begin{array}{r}
 12 \times 12 \times 300 = 43200 \\
 12 \times 30 = 360 \\
 \hline
 43560 \\
 43200 \times 3 = 129600 \\
 360 \times 3 \times 3 = 3240 \\
 3 \times 3 \times 3 = 27 \\
 \hline
 132867
 \end{array}$$

$$\begin{array}{r}
 123 \times 123 \times 300 = 4538700 \\
 123 \times 30 = 3690 \\
 \hline
 4542390 \\
 4538700 \times 4 = 18154800 \\
 3690 \times 4 \times 4 = 59040 \\
 4 \times 4 \times 4 = 64 \\
 \hline
 18213904
 \end{array}$$

9.

$$\begin{array}{r}
 41673648.563(346.7 \\
 27 \\
 \hline
 2790 \overline{)14673} \\
 \underline{10800} \\
 1440 \\
 64 \\
 \hline
 12304 \\
 347820 \overline{)2369648} \\
 \underline{2080800} \\
 36720 \\
 216 \\
 \hline
 2117736 \\
 251912563 \\
 (Carried up.)
 \end{array}$$

$$\begin{array}{r}
 3 \times 3 \times 300 = 2700 \\
 3 \times 30 = 90 \\
 \hline
 2790 \\
 2700 \times 4 = 10800 \\
 90 \times 4 \times 4 = 1440 \\
 4 \times 4 \times 4 = 64 \\
 \hline
 12304 \\
 34 \times 34 \times 300 = 346800 \\
 34 \times 30 = 1020 \\
 \hline
 347820 \\
 346800 \times 6 = 2080800 \\
 1020 \times 6 \times 6 = 36720 \\
 6 \times 6 \times 6 = 216 \\
 \hline
 2117736
 \end{array}$$

9. (Continued.)

| | |
|----------------------------------|--|
| (Brought up.) | $346 \times 346 \times 300 = 35914800$ |
| $35925180 \overline{)251912563}$ | $346 \times 30 = 10380$ |
| 251403600 | 35925180 |
| 508620 | $35914800 \times 7 = 251403600$ |
| 343 | $10380 \times 7 \times 7 = 508620$ |
| 251912563 | $7 \times 7 \times 7 = 343$ |
| | 251912563 |

10.

| | |
|-----------------------------------|---|
| $483921.516051 (78.51$ | $7 \times 7 \times 300 = 14700$ |
| 343 | $7 \times 30 = 210$ |
| $14910 \overline{)140921}$ | 14910 |
| 117600 | $14700 \times 8 = 117600$ |
| 13440 | $210 \times 8 \times 8 = 13440$ |
| 512 | $8 \times 8 \times 8 = 512$ |
| 131552 | 131552 |
| $1827540 \overline{)9360516}$ | $78 \times 78 \times 300 = 1825200$ |
| 9126000 | $78 \times 30 = 2340$ |
| 58500 | 1827540 |
| 125 | $1825200 \times 5 = 9126000$ |
| 9184625 | $2340 \times 5 \times 5 = 58500$ |
| $184891050 \overline{)184891051}$ | $5 \times 5 \times 5 = 125$ |
| 184867500 | 9184625 |
| 23550 | $785 \times 785 \times 300 = 184867500$ |
| 1 | $785 \times 30 = 23550$ |
| 184891051 | 184891050 |
| | $184867500 \times 1 = 184867500$ |
| | $23550 \times 1 \times 1 = 23550$ |
| | $1 \times 1 \times 1 = 1$ |
| | 184891051 |

11.

$$\begin{array}{r}
 \begin{array}{r}
 \dot{8}.144865728(2.012 \\
 8 \\
 120600 \overline{)144865} \\
 \underline{120000} \\
 600 \\
 1 \\
 \underline{120601} \\
 12126330 \overline{)24264728} \\
 \underline{24240600} \\
 24120 \\
 8 \\
 \underline{24264728}
 \end{array}
 &
 \begin{array}{r}
 20 \times 20 \times 300 = 120000 \\
 20 \times 30 = 600 \\
 \underline{120600} \\
 120000 \times 1 = 120000 \\
 600 \times 1 \times 1 = 600 \\
 1 \times 1 \times 1 = 1 \\
 \underline{120601} \\
 201 \times 201 \times 300 = 12120300 \\
 201 \times 30 = 6030 \\
 \underline{12126330} \\
 12120300 \times 2 = 24240600 \\
 6030 \times 2 \times 2 = 24120 \\
 2 \times 2 \times 2 = 8 \\
 \underline{24264728}
 \end{array}
 \end{array}$$

12.

$$\begin{array}{r}
 \sqrt[3]{\frac{128}{1000}} = 729(9 \quad \begin{array}{r} 4096(16 \\ 1 \\ - 330 \overline{)3096} \\ \underline{1800} \\ 1080 \\ \underline{216} \\ 3096 \end{array} \quad \frac{8}{16} \text{ Ans.}
 \end{array}$$

13.

$$\begin{array}{r}
 \sqrt[3]{49\frac{8}{27}} = \sqrt[3]{133\frac{1}{27}} \quad \begin{array}{r} 1331(11 \\ 1 \\ 330 \overline{)331} \\ \underline{300} \\ 30 \\ 1 \\ \underline{331} \end{array} \quad \begin{array}{r} 27(3 \\ 27 \end{array} \quad \frac{1}{3} = 3\frac{1}{3} \text{ Ans.}
 \end{array}$$

14.

$$\sqrt[3]{166\frac{1}{2}} = \sqrt[3]{133\frac{1}{2}} \quad 133\frac{1}{2}(11 \quad \frac{8}{8} \quad 1\frac{1}{2} = 5\frac{1}{2} \text{ Ans.}$$

$$\begin{array}{r} 330 \overline{)331} \\ 300 \\ 30 \\ 1 \\ \hline 331 \end{array}$$

15.

$$\sqrt[3]{85\frac{2}{3}} = \sqrt[3]{1064\frac{8}{22}} \quad 1064\frac{8}{22}(22 \quad 125\frac{5}{125} \quad 2\frac{2}{3} = 4\frac{2}{3} \text{ Ans.}$$

$$\begin{array}{r} 1260 \overline{)2648} \\ 2400 \\ 240 \\ 8 \\ \hline 2648 \end{array}$$

16.

17.

$$4^s = 64 : 6^s = 216 :: 50 \quad \text{lb.} \quad 16 : 8 :: 12^s = 1728 \quad \text{in.}$$

$$\begin{array}{r} .50 \\ 64 \overline{)10800} \end{array} (168.7 + \text{lb. Ans.} \quad \begin{array}{r} 16 \overline{)13824} \\ 864 \end{array}$$

18.

$$6^s = 216 : 7^s = 343 :: 800 \quad \text{ft.} \quad 864(9.5 + 12 \quad \text{lb.}$$

$$\begin{array}{r} 800 \\ 216 \overline{)274400} \end{array} (1270.3 + \quad \begin{array}{r} 729 \\ 24570 \overline{)135000} \\ 121500 \\ 6750 \\ 125 \\ \hline 128375 \end{array} \quad \begin{array}{r} 9.5 + \\ 2.5 + \\ \hline \text{[Ans.} \end{array}$$

$$\begin{array}{r} 1270.3 + \\ \text{[lb. Ans.} \end{array}$$

19.

$$1^s : 2^s = 8 :: 1 \quad \text{ft. cor.}$$

$$\begin{array}{r} 1 \\ 1 \overline{)8} \end{array} (8 \text{ cords, Ans.}$$

20.

$$80^s = 27000^{\text{in.}} : 40^s = 64000^{\text{in.}} :: 1000^{\text{lb.}}$$

$$27000 \overline{)64000000} (2370.3 \text{ lb. Ans.}$$

21.

$$6^s = 216^{\text{in.}} : 12^s = 1728^{\text{in.}} :: 16^{\text{oz.}}$$

$$\begin{array}{r} 16 \\ 10368 \\ 1728 \\ 216 \overline{)27648} (128 \text{ oz. Ans.} \\ 216 \\ \hline 604 \\ 432 \\ \hline 1728 \\ 1728 \\ \hline \end{array}$$

Section 50. (p. 163.)

GEOMETRICAL PROBLEMS.

1. $25 \times 3 = 75$ feet, Ans.
2. $37 \times 27 = 999 \text{ ft.}$; $40 \times 20 = 800 \text{ ft.}$; $999 - 800 = 199 \text{ ft.}$ Ans.
3. $15 \times 12 = 180$ feet, Ans.
4. $24 \times 18 = 432$; $432 \div 2 = 216$ feet, Ans.
5. $50 + 60 + 70 = 180$; $180 \div 2 = 90$; $90 - 50 = 40$; $90 - 60 = 30$; $90 - 70 = 20$; $90 \times 40 \times 30 \times 20 = 2160000$; $\sqrt{2160000} = 1469.69 +$ rods, Ans.
6. $3.141592 \times 50 = 157.0796 +$ feet, Ans.
7. $.886227 \times 40 = 35.44 +$ rods, Ans.
8. $.707016 \times 50 = 35.35 +$ feet, Ans.

9. $.785398 \times 200 \times 200 = 31415.92 +$ feet, Ans.
10. $.31831 \times 80 = 25.46 +$ miles, Ans.
11. $.282094 \times 100 = 28.20 +$ rods, Ans.
12. $.2756646 \times 1000 = 275.66 +$ feet, Ans.
13. $.225079 \times 100 = 22.5 +$ rods square, Ans.
14. $8 \times 8 \times 8 = 512$ feet, Ans.
15. $30 \times 20 \times 10 = 6000$ cubic feet. $30 + 20 = 50$;
 $50 \times 2 = 100$; $100 \times 10 = 1000$; $30 \times 20 \times 2 =$
 1200 ; $1000 + 1200 = 2200$ square feet. $6000 - 2200$
 $= 3800$ difference, Ans.
16. $5 + 4 + 3 = 12$; $12 \div 2 = 6$; $6 - 5 = 1$; $6 - 4$
 $= 2$; $6 - 3 = 3$; $6 \times 1 \times 2 \times 3 = 36$; $\sqrt{36} = 6$;
 $6 \times 20 = 120$ feet, Ans.
17. $.785398 \times 5 \times 5 \times 30 = 589.0485$; $589.0485 \div 3$
 $= 196.34 +$ feet, Ans.
18. $693 \times 693 = 480249$; $480249 \times 500 = 240124500$;
 $240124500 \div 3 = 80041500$ cubic feet. $80041500 \div 8$
 $= 10005187.5$; $10005187.5 \div 5280 = 1894.9 +$ miles,
 Ans.
19. $50 \times 12 = 600$; $600 \div 2 = 300$ feet, Ans.
20. $80 \times 15 = 450$; $30 - 15 = 15$; $15 \times 15 = 225$;
 $225 \div 3 = 75$; $450 + 75 = 525$; $525 \times 220 = 115500$
 cubic feet, Ans.
21. $12 \times 6 = 72$; $6 \times 6 = 36$; $36 \div 3 = 12$; $72 + 12$
 $= 84$; $84 \times .785398 \times 20 = 1319.46364$; 1319.46364
 $\div 144 = 9.162 +$ feet, Ans.
22. $20 \times 20 \times 20 \times .5236 = 4188.8 +$ inches, Ans.
23. $3.141592 \times 20 \times 20 = 1256.6 +$ inches, Ans.
24. $10 \times 3 = 30$; $3 \times 2 = 6$; $30 - 6 = 24$; 3×3
 $= 9$; $24 \times 9 = 216$; $216 \times .5236 = 113.0976$ feet,
 Ans.
25. $10 \times 10 = 100$; $100 \times 3 = 300$; $8 \times 8 = 64$;
 $300 + 64 = 364$; $364 \times 8 = 2912$; $2912 \times .5236 =$
 1524.7232 in. Ans.

26. $10 \times 10 = 100$; $100 \div 3 = 33.333333$; $\sqrt{33.333333} = 5.773+$ inches, side of a cube, Ans.

27. $8 \times 12 = 96$; $4 \times 12 = 48$; $3 \times 12 = 36$; $96 \times 48 \times 36 = 165888$; $165888 \div 231 = 718.1+$ gallons, Ans.

28. $12 \times 12 = 144$; $5 \times 12 = 60$; $4 \times 12 = 48$; $144 \times 60 \times 48 = 414720$; $414720 \div 2150.42 = 192.8+$ bushels, Ans.

29. $30 - 24 = 6$; $6 \times .7 = 4.2$; $24 \div 4.2 = 28.2$; $28.2 \times 28.2 \times 40 = 3180.96$; $3180.96 \div 294 = 108.1+$ gallons, Ans.

30. $60 \div 4 = 15$; $15 \times 15 = 225$; $225 \times 40 = 9000$; $9000 \div 144 = 62\frac{1}{2}$ feet, Ans

Section 51. (p. 165.)

MISCELLANEOUS QUESTIONS.

1. 100cts. : 10cts. :: 72d. : $7\frac{1}{2}$ d.; $7\frac{1}{2} - 7 = \frac{1}{2}$ d. Ans.

2. $7\frac{1}{2} = 7\frac{1}{2}$; $7\frac{1}{2} - \frac{1}{2} = 7\frac{1}{2}$ Ans.

3. $4\frac{1}{2} = 4\frac{1}{2}$; $3\frac{1}{2} = 3\frac{1}{2}$; $4\frac{1}{2} + 3\frac{1}{2} = 7\frac{1}{2}$ Ans.

4. $5\frac{1}{2} \times 5 = 27\frac{1}{2}$; $27\frac{1}{2} - 3\frac{1}{2} = 23\frac{1}{2}$ Ans.

5. $\frac{7}{11}$ m. = $\frac{7}{11} \times \frac{8}{1} = \frac{56}{11} = 5\frac{1}{11}$ fur.; $\frac{1}{11}$ fur. = $\frac{1}{11} \times \frac{40}{1} = \frac{40}{11}$ rods; $\frac{7}{11}$ rd. = $\frac{7}{11} \times \frac{32}{1} = \frac{224}{11} = 10\frac{1}{11}$ ft.; $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ = 6in.; $\frac{7}{8}$ fur. = $\frac{7}{8} \times \frac{40}{1} = \frac{280}{8} = 35$ rd.; $\frac{1}{8} \times \frac{32}{1} = \frac{32}{8} = 4$ ft.; $\frac{1}{8}$ ft. = $\frac{1}{8} \times \frac{12}{1} = \frac{12}{8} = 1\frac{1}{2}$ in.

| fur. | rd. | ft. | in. |
|-------|-----|-----|--------|
| 5 | 3 | 10 | 6 |
| | 31 | 1 | 10 |
| <hr/> | | | |
| 4 | 12 | 8 | 8 Ans. |

$$6. \frac{2}{11}R. = \frac{2}{11} \times 4^0 = \frac{8^0}{11} = 32\frac{8}{11}p.; \frac{8}{11}p. = \frac{8}{11} \times 272\frac{1}{2} = 217\frac{1}{2} = 198 \text{ feet.}$$

| | | | | |
|-------|----|----|---------------|--------------------|
| A. | R. | p. | ft. | in. |
| 7 | 0 | 0 | 0 | 0 |
| | | 32 | 198 | 0 |
| <hr/> | | | | |
| 6 | 3 | 7 | 74 | 0 |
| | | | $\frac{1}{4}$ | $\frac{1}{4} = 36$ |
| <hr/> | | | | |
| 6 | 3 | 7 | 74 | 36 Ans. |

$$7. 7 : 12 :: \frac{8}{5} : \frac{88}{5} = 3\frac{4}{5} \text{ h. time Swift will travel the distance.}$$

$$5 : 12 :: \frac{7}{11} : \frac{84}{5} \text{ h. = time Slow will travel the distance.}$$

$$\frac{84}{5} - \frac{88}{5} = \frac{4}{115} \text{ h. ; } \frac{4}{115} \times \frac{60}{1} \times \frac{60}{1} = \frac{14400}{1155} = 12\frac{8}{11} \text{ sec. Ans.}$$

$$8. \frac{3}{4}T. = \frac{3}{4} \times 2^0 = \frac{10^0}{8} \text{ cwt. ; } \frac{10^0}{8} \text{ cwt. : } \frac{1}{4} \text{ cwt. :: } \$49 = \frac{10^0}{100} \times \frac{1}{4} \times \frac{4^0}{1} = \$3.92 \text{ Ans.}$$

$$9. 8 \times 4 \times 2 = 64; 1728 \div 64 = 27, \text{ number of bricks in a cubic foot; } 40 \times 20 \times 2 = 1600, \text{ cubic feet in the wall; } 1600 \times 27 = 43200 \text{ bricks, Ans.}$$

$$10. 80 + 40 = 120; 120 \times 2 = 240 \text{ feet round the house. From this sum we deduct 4 feet for the corners. } 240 - 4 = 236; 236 \times 25 \times 27 = 159300 \text{ bricks, Ans.}$$

$$11. 18 \times 12 \times 144 = 31104, \text{ number of square inches in the floor; } 8 \times 8 = 64, \text{ square inches in a tile; } 31104 \div 64 = 486 \text{ tiles, Ans.}$$

$$12. 11 \text{ cwt. } 3 \text{ qr. } 19 \text{ lb.} = 1335 \text{ lb. ; } 83 \text{ cwt. } 2 \text{ qr. } 11 \text{ lb.} = 9363 \text{ lb.}$$

$$\left. \begin{array}{l} 1335 \text{ lb. : } 9363 \text{ lb.} \\ 46 \text{ m. : } 96 \text{ m.} \end{array} \right\} :: \$18.25$$

$$9363 \times 96 \times 18.25 = 16403976.00; 1335 \times 46 = 61410; 16403976 \div 61410 = \$267.12\frac{456}{2017} \text{ Ans.}$$

$$13. \$100 - \$25 = \$75; \$75 : \$100 :: \$24 : \$32, \text{ value of the cloth; } \$34 - \$32 = \$2; \$32 : \$2 :: \$100 : \$6\frac{1}{2} \text{ Ans.}$$

$$14. 120 - 20 = 100 \text{ gal. remaining; } \$30 + \$10 = \$40$$

793015 A

= price to be obtained ; 100gal. : 1gal. :: \$40 : \$0.40
Ans.

15. $117\frac{2}{3} = 82\frac{2}{3}$; $112\frac{2}{3} = 10\frac{10}{9}$; $82\frac{2}{3} \times 10\frac{10}{9} = 830\frac{220}{9}$
= 13178 $\frac{2}{3}$ rods = 82A. 1R. 18p. 2yd. 7ft. 133 $\frac{1}{2}$ in. Ans.

16. $\$128.25 \times \$1.03 = \$132.0975$; $\$132.0975 \times$
 $\$1.06 = \$140.02+$ Ans.

17. 27bu. : 36bu. :: \$8.75 : \$11.66+ Ans.

18. $\$1.25 \times 93 = 116.25$; $\$116.25 \div \$0.50 = 232\frac{1}{2}$
bushels, Ans.

19. $\$1.25 \times 75 = \93.75 ; $\$93.75 \div \$1.30 = 72\frac{3}{8}$
bushels, Ans.

20. $\frac{1}{3}$ of 24h. = 8h. ; $\frac{1}{4}$ of 24h. = 6h. ; $8 + 6 + 2 + 6$
= 22 hours ; 24h. — 22h. = 2h. Ans.

21. $\frac{1}{4}$ of 24h. = 6h. ; $\frac{1}{5}$ of 24h. = $4\frac{4}{5}$ h. ; $\frac{1}{6}$ of 24h. =
4h. ; $\frac{1}{7}$ of 24h. = $3\frac{3}{7}$ h. ; $6 + 4\frac{4}{5} + 4 + 3\frac{3}{7} + 2 =$
 $20\frac{8}{35}$ h. ; 24h. — $20\frac{8}{35}$ h. = $3\frac{27}{35}$ h. Ans.

22. $7\frac{2}{3} = 3\frac{8}{9}$; $5\frac{1}{3} = 4\frac{2}{3}$; $3\frac{8}{9} \times 4\frac{2}{3} = 18\frac{8}{9}$; 160rd. :
 $18\frac{8}{9}$:: \$25.75 ; $\frac{1}{160} \times 18\frac{8}{9} \times 25.75 = 47\frac{248}{225}$ =
\$6.65 $\frac{133}{144}$ Ans.

23. $5\frac{1}{2}$ E. E. : $7\frac{1}{4}$ yd. :: \$15.16

$$\begin{array}{r} 5 \qquad 4 \\ \hline 28 \qquad 287 \\ \hline 15.16 \\ \hline 1722 \\ 287 \\ \hline 1435 \\ 287 \end{array}$$

28)4350.92(\$15.539 Ans.

24. $5\frac{1}{2}$ feet : 4 feet :: 150 feet : $107\frac{1}{2}$ feet, Ans.

25. 100 : \$150 :: 6m. : 9m. Ans.

26. $\$1.20 \times 150 = \180.00 = sum paid by the polls ;
 $\$6045.50 - \$180.00 = \$5865.50$ to be paid on valua-
tion ; $\$293275 : \$5865.50 :: \$1.00 : \0.02 on a dol-
lar ; $\$1.00 : \$0.02 :: \$3675 : \73.50 ; $\$1.20 \times 4 =$
\$4.80 ; $\$4.80 + \$73.50 = 78.30$ Ans.

27. 2cwt. 3qr. 11lb. = 319lb. ; $319 \times 97 = 30943\text{lb.}$;
 $\pounds 3. 17\text{s. } 9\text{d.} = 933\text{d.}$; $112\text{lb.} : 30943\text{lb.} :: 933\text{d.} :$
 $257766\frac{27}{112}\text{d.}$; $257766\frac{27}{112}\text{d.} = \pounds 1074. 0\text{s. } 6\frac{27}{112}\text{d.}$ Ans.

| | | | | |
|-----|-------|-----|-----|--------------------|
| 28. | y. | mo. | da. | |
| | 1842 | 9 | 29 | \$ 17.86 |
| | 1840 | 1 | 9 | .163 $\frac{1}{2}$ |
| | <hr/> | | | 5358 |
| | 2 | 8 | 20 | 10716 |
| | | | | 1786 |
| | | | | 595 |
| | | | | <hr/> |
| | | | | 29.1713 |
| | | | | 7 $\frac{1}{2}$ |
| | | | | <hr/> |
| | | | | 2041991 |
| | | | | 72928 |
| | | | | <hr/> |
| | | | | 6) 211.4919 |
| | | | | <hr/> |
| | | | | \$35.24,76 Ans. |

| | | | | |
|-----|-------|-----|-----|-----------------|
| 29. | y. | mo. | da. | |
| | 1842 | 8 | 25 | \$ 97.87 |
| | 1840 | 0 | 7 | .163 |
| | <hr/> | | | 29361 |
| | 2 | 8 | 18 | 58722 |
| | | | | 9787 |
| | | | | <hr/> |
| | | | | 15.95281 |
| | | | | 9 |
| | | | | <hr/> |
| | | | | 6) 143.57529 |
| | | | | <hr/> |
| | | | | \$23.92921 Ans. |

30.

| | |
|---|------------|
| Principal on interest from March 1, 1836 | \$ 1728.00 |
| Interest from March 1, 1836, to January 1, 1837, 10 months | 86.40 |
| | <hr/> |
| Amount | 1814.40 |
| First payment, Sept. 25, 1836, a sum less than the interest | \$ 50.00 |
| Second payment, Jan. 1, 1837, a sum greater than the interest | 60.00 |
| | <hr/> |
| | 110.00 |
| (Carried up.) | <hr/> |
| | 1704.40 |

| | | |
|--|---------------|---------------|
| New principal carrying interest from Jan. 1, 1837 | | \$ 1704.40 |
| Interest from Jan. 1, 1837, to Jan. 1, 1839, 2 years | | <u>204.52</u> |
| | Amount | 1908.92 |
| Third payment, June 7, 1837, a sum less than the interest | \$ 8.00 | |
| Fourth payment, Dec. 25, 1837, a sum less than the interest | 10.00 | |
| Fifth payment, March 6, 1838, a sum less than the interest | 5.00 | |
| Sixth payment, Sept. 1, 1838, a sum less than the interest | 9.00 | |
| Seventh payment, Jan. 1, 1839, a sum larger than the interest | <u>300.00</u> | |
| | | <u>332.00</u> |
| New principal carrying interest from Jan. 1, 1839 | | 1576.92 |
| Interest from Jan. 1, 1839, to July 4, 1839, 6 months 3 days | | <u>48.09</u> |
| | Amount | 1625.01 |
| Eighth payment, July 4, 1839, a sum greater than the interest | | <u>100.00</u> |
| New principal carrying interest from July 4, 1839 | | 1525.01 |
| Interest from July 4, 1839, to Jan. 25, 1841, 18 months 21 days | | <u>142.58</u> |
| | Amount | 1667.59 |
| Ninth payment, Sept. 6, 1840, a sum less than the interest | \$ 14.00 | |
| Tenth payment, Jan. 25, 1841, a sum greater than the interest | <u>500.00</u> | |
| | | <u>514.00</u> |
| New principal carrying interest from Jan. 25, 1841 | | 1153.59 |
| Interest from Jan. 25, 1841, to March 9, 1842, 13 months 16 days | | <u>77.67</u> |
| (Carried up.) | Amount | 1231.26 |

| | | |
|---|---------|------------------|
| (Brought up.) | Amount | \$1231.36 |
| Eleventh payment, Dec. 11, 1841, a sum less than the interest | \$15.00 | |
| Twelfth payment, March 9, 1842, a sum greater than the interest | 200.00 | |
| | | <u>215.00</u> |
| New principal carrying interest from March 9, 1842 | | 1016.26 |
| Interest from March 9, 1842, to Nov. 29, 1842, 10 months 20 days | | 44.03 |
| Balance due Nov. 29, 1836 | | <u>\$1060.29</u> |

31.

| | | |
|--|-----------|------------------|
| Principal bearing interest from Oct. 29, 1836 | \$1000.00 | |
| Compound interest on \$1000 from Oct. 29, 1836, to Oct. 29, 1842, 6 years | | 418.51 |
| Amount of principal to Oct. 29, 1842 | | <u>1418.51</u> |
| First payment, Jan. 1, 1837 | \$125.00 | |
| Compound interest from Jan. 1, 1837, to Oct. 29, 1842, 5y. 9m. 28da. | 50.58 | |
| Second payment, June 5, 1837 | 316.00 | |
| Compound interest from June 5, 1837, to Oct. 29, 1842, 5y. 4m. 24da. | 117.02 | |
| Third payment, Sept. 25, 1837 | 417.00 | |
| Compound interest from Sept. 25, 1837, to Oct. 29, 1842, 5y. 1m. 4da. | 144.20 | |
| Fourth payment, April 1, 1838 | 100.00 | |
| Compound interest from April 1, 1838, to Oct. 29, 1842, 4y. 6m. 28da. | 30.62 | |
| Fifth payment, July 5, 1838 | 50.00 | |
| Compound interest from July 5, 1838, to Oct. 29, 1842, 4y. 3m. 24da. | 14.30 | |
| Amount of indorsements | | <u>\$1364.73</u> |
| Balance due Oct. 29, 1842 | | <u>\$53.79</u> |

32. $100 \times 80 = 8000$ square feet in the garden; $100 + 80 = 180$; $180 \times 2 = 360$ ft. To this we add 4 feet for

- each corner = 16 feet ; $360 + 16 = 376 =$ length of the ditch ; $376 \times 4 = 1504$ ft. superficial contents of the ditch ; $8000 \div 1504 = 5\frac{1}{2}$ feet, depth of the ditch, Ans.
33. $15\frac{1}{2} \times 12 = 186$ in. ; $11\frac{1}{4} \times 12 = 135$ in. ; $7\frac{3}{4} \times 12 = 93$ in. ; $186 + 135 = 321$; $321 \times 2 = 642$; $642 \times 93 = 59706$ square inches ; $59706 \div 30 = 1990\frac{1}{5}$; $1990\frac{1}{5} \div 36 = 55\frac{1}{5}$ yds. Ans.
34. $15\frac{1}{2} + 11\frac{1}{4} = 26\frac{3}{4}$; $26\frac{3}{4} \times 2 = 53\frac{1}{2} = 197$; $7\frac{3}{4} = \frac{31}{4}$; $197 \times \frac{31}{4} = 3088\frac{1}{2}$; $15\frac{1}{2} = \frac{31}{2}$; $11\frac{1}{4} = \frac{45}{4}$; $\frac{45}{4} \times \frac{31}{2} = 1388\frac{1}{2}$; $3088\frac{1}{2} + 1388\frac{1}{2} = 4477 = 589$ square feet ; $589 \div 9 = 65\frac{4}{9}$ square yards ; $65\frac{4}{9} \times 10 = \$6.54\frac{4}{9}$ Ans.
35. $40 \times 40 = 1600$; $1600 \div 3 = 533.33\frac{1}{3}$; $\sqrt{533.33\frac{1}{3}} = 23.09401$; $533.33\frac{1}{3} \times 23.09401 = 12316.8 +$ Ans.
36. $32 : 4 :: 18.5^3 : 791.453125$; $\sqrt[3]{791.453125} = 9.25 = 9\frac{1}{4}$ inches wide ; $32 : 4 :: 8^3 : 64$; $\sqrt[3]{64} = 4$ inches deep, Ans.
37. As $\frac{1}{3}$ of the estate was given to the wife, $\frac{2}{3}$ of the estate will remain. The eldest son has $\frac{1}{4}$ of the $\frac{2}{3} = \frac{1}{6}$. The wife and son will therefore have $\frac{1}{3} + \frac{1}{6} = \frac{1}{2}$ of the estate. The daughter is to have $\frac{1}{3}$ of the residue, that is, $\frac{1}{3}$ of $\frac{1}{2} = \frac{1}{6}$. Therefore the wife, son, and daughter will have $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{6} = \frac{1}{2}$; and $\frac{1}{2} - \frac{1}{6} = \frac{1}{3}$ will remain to be divided among the other heirs. But if $\frac{1}{3}$, the daughter's portion, is \$151.33 $\frac{1}{3}$, $\frac{1}{3}$, the residue, will be 5 times as much, that is, 5 times \$151.33 $\frac{1}{3}$ = \$756.66 $\frac{2}{3}$ Ans.

OPERATION.

$$\frac{1}{3} : \frac{1}{6} :: \$151.33\frac{1}{3} : \$756.66\frac{2}{3} \text{ Ans.}$$

38. If the son receives $\frac{1}{4}$, there will remain $\frac{3}{4} - \frac{1}{4} = \frac{1}{2}$; and $\frac{1}{3}$ of $\frac{3}{4} = \frac{1}{4}$ will be the daughter's portion. The son and daughter will receive $\frac{1}{4} + \frac{1}{4} = \frac{1}{2} = \frac{2}{4}$ of the estate ; there will therefore remain $\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$ for the wife ; and the son will receive $\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$ more than the daugh-

ter; therefore, $\frac{1}{10} : \frac{2}{5} :: \$100 : \$600$ wife's portion,
Ans.

39. $\$1250 - \$500 = \$750$, which was $\frac{2}{3}$ of his capital.

He therefore lost $\$750 \div 3 = \250 Ans.

40. $\frac{1}{4}$ of $\frac{1}{3} = \frac{1}{12}$; $\frac{1}{4} - \frac{1}{12} = \frac{1}{6}$ Ans.

41. $\$112.50 : \$100 :: \$50 : \$44.44\frac{2}{3}$ Ans.

42. 17cwt. 3qr. 18lb. = 2006lb.; $2006 \times 7\frac{1}{2} = 15045d.$;

$15045d. = \text{£}63.13s.9d. = \$208.95\frac{3}{8}$ Ans.

43. $\$5.00 : \$17.50 :: \frac{3}{11}yd. : \frac{2}{11}yd.$ Ans.

44. 17rd. 10ft. = $290\frac{1}{2}ft.$; $8\frac{1}{2} = 4\frac{1}{2}h.$; therefore, $\frac{7}{17}h. :$
 $4\frac{1}{2}h. :: 290\frac{1}{2}ft. : 6208\frac{1}{2}ft. = 1m.928\frac{1}{2}ft.$ Ans.

45. $\$11.75 : \$100 :: 2\frac{3}{4}A. : 19A.1R.32\frac{1}{2}\frac{3}{8}p.$ Ans.

46. $\$128 - \$70 = \$58$; $\$58 : \$70 :: \$1000 : 1206.89\frac{1}{2}$
Ans.

47. $\$1.218\frac{1}{3} : \$1.00 :: \$1000 : \$820.79\frac{4}{5}\frac{1}{11}$ Ans.

48. $\$97.57 - \$88 = \$9.57$.

$$\left. \begin{array}{l} \$88 : \$100 \\ 18m. : 12m. \end{array} \right\} :: \$9.57$$

$$\frac{\$9.57 \times 1000 \times 12}{18 \times 88} = \frac{11484}{168} = 7\frac{1}{2} \text{ per. cent. Ans.}$$

49. $\frac{3}{4}gal. : 7\frac{1}{4}gal. :: \$87 = \frac{3}{4} : \frac{31}{4} :: \frac{31}{4} = \frac{3}{4} \times \frac{31}{4} \times \frac{31}{4}$
 $= \frac{1281}{4} = \$1051.25$ Ans.

50. $18\frac{3}{4}yd. : 5yd. :: \$71 = 1\frac{3}{4} : \frac{1}{4} :: \frac{1}{4} = \frac{1}{128} \times \frac{1}{4} \times$
 $\frac{1}{4} = \frac{1}{128} = \$19.26\frac{1}{8}$ Ans.

51. 18 tons, 17cwt. 3qr. = 42308lb.; 112lb. : 42308lb.

$:: \$9.50 : \$3588\frac{1}{2}$; $\$4.00 : \$3588\frac{1}{2} :: 1yd. : 897\frac{1}{2}yd.$

Ans.

52. 1bu. : 98bu. :: $\$0.45 : \44.10 ; $\$1.25 : \$44.10 ::$

1bu. : $35\frac{1}{5}bu.$ Ans.

- 53. 86 tons, 18cwt. 3qr. 20lb. = 194760lb.; 2240lb. : 194760lb. :: \$8.50 : \$739.04 $\frac{1}{2}$ $\frac{3}{8}$.

$$\$37.50 : \$739.04\frac{1}{2}\frac{3}{8} :: 1A.$$

$$\begin{array}{r} 1 \\ 37.50 \overline{) 739.04\frac{1}{2}\frac{3}{8}} \quad (19A. 2R. 33\frac{2}{5}p. \text{ Ans.} \\ \underline{3750} \end{array}$$

$$\begin{array}{r} 36404 \\ \underline{33750} \end{array}$$

$$\begin{array}{r} 2654\frac{1}{2}\frac{3}{8} \\ \underline{4} \end{array}$$

$$37.50 \overline{) 10617\frac{7}{8}} \quad (2R.$$

$$\underline{7500}$$

$$3117\frac{7}{8}$$

$$\underline{40}$$

$$37.50 \overline{) 124714\frac{7}{8}} \quad (33\frac{2}{5}p.$$

$$\underline{11250}$$

$$12214\frac{7}{8}$$

$$\underline{11250}$$

$$964\frac{7}{8}$$

$$\underline{3750} = \frac{964\frac{7}{8}}{3750} = \frac{8750}{35}$$

54. By the question, we find $\frac{1}{7}$ of the time passed from noon equal to $\frac{1}{11}$ of the time to midnight. We reduce these fractions to a common denominator, $\frac{1}{7}$ and $\frac{1}{11} = \frac{11}{77}$ and $\frac{7}{77}$. When fractions are reduced to a common denominator, their value is as their numerators. Therefore 11 will represent the time past from noon, and 7 the time to midnight, and $11 + 7 = 18$ will represent 12 hours; therefore $7 : 18 :: 12h. : 4h. 40min.$ time from noon, Ans.

55. $200 \times 4 \times 40 \times 272\frac{1}{2} \times 20 = 174,240,000$ feet, Ans.

56. $20000 \times 4 \times 40 \times 272\frac{1}{2} \times 144 \times 3 = 376358400000$ cubic inches; $376358400000 \div 232 = 1334604255\frac{4}{11}$ gallons; $1334604255\frac{4}{11} \div 100 = 13346042$ hhd. 55gal.; $1\frac{4}{11}gal. = 1qt. 0pt. 2\frac{2}{11}gi.$ Ans.

57. $1^{\circ} : 71^{\circ} 4' :: 4\text{min.} : 4\text{h. } 44\text{m. } 16\text{sec.}$

$$\begin{array}{r} \text{h.} \quad \text{m.} \quad \text{sec.} \\ 11 \quad 16 \quad 0 \\ 4 \quad 44 \quad 16 \\ \hline 6 \quad 31 \quad 44 \text{ Ans.} \end{array}$$

58.

$$\begin{array}{r} 18^{\circ} \quad 24' \text{ E.} \\ 67^{\circ} \quad 21' \text{ W.} \\ \hline \end{array}$$

$$1^{\circ} : 85^{\circ} 45' :: 4\text{min.}$$

$$\begin{array}{r} 60 \quad 60 \\ \hline 60 \quad 5145 \\ \quad \quad 4 \end{array}$$

$$60 \overline{) 20580}$$

$$60 \overline{) 343} \text{ minutes}$$

$$\underline{5\text{h. } 43\text{m.}}$$

$$\begin{array}{r} \text{h.} \quad \text{m.} \\ 2 \quad 36 \text{ A. M.} \end{array}$$

$$\begin{array}{r} 5 \quad 43 \end{array}$$

$$\underline{8 \quad 53 \text{ P. M.}}$$

NOTE. To perform this question we are obliged to add 12 hours to the minuend, and it brings the time to the evening of the previous day.

59.

$$\begin{array}{r} \text{h.} \quad \text{m.} \\ 12 \quad 0 \\ 11 \quad 36 \\ \hline \end{array}$$

$$4\text{m.} : 24\text{m.} :: 1^{\circ}$$

$$\begin{array}{r} 1 \\ 4 \overline{) 24(6^{\circ}} \\ \underline{24} \end{array}$$

$$16^{\circ} \quad 18' \text{ W.}$$

$$\begin{array}{r} 6^{\circ} \quad 0 \end{array}$$

$$\underline{10^{\circ} \quad 18' \text{ W.}}$$

NOTE. The answer to this question in some editions of the Arithmetic is incorrect.

60. $3000 \times 5280 = 15840000$; $15840000 \div 1142 = 13870 + \text{seconds}$; $13870 \div 60 = 231\text{m. } 10\text{sec.}$; $231 \div 60 = 3\text{h. } 51\text{m.}$; $3\text{h. } 51\text{m. } 10 + \text{sec.}$ Ans.

61. $1142 \times 10 = 11420$; $11420 \div 5280 = 2\text{m. } 860\text{ft.}$ Ans.

62. $2^3 = 8$; $3^3 = 27$; $\$125.00 : \$421.87\frac{1}{2}$ Ans.

63. $20 - 15 = 5$; $15 : 10 :: 10 : 30$ cents, Ans.

64. $12\frac{1}{2} - 10 = 2\frac{1}{2}$; $10 : 2\frac{1}{2} :: 100 : 25$ per cent.; $19 - 15 = 4$; $15 : 4 :: 100 : 26\frac{2}{3}$ per. cent.; $26\frac{2}{3} - 25 = 1\frac{2}{3}$ per cent. which Y. makes more than Q.

65. From Sept. 25 to Jan. 1 are 97 days = 139680 min

utes. From 23 minutes past 3 A. M. to midnight is 20h. 33min. = 1233 minutes. From Jan. 1, 1787, to Jan. 1, 1844, are 57 years = $365 \times 57 \times 24 \times 60 = 29959200$ minutes. From Jan. 1, 1844, to July 4, 1844, are 185 days = $185 \times 24 \times 60 = 266400$ min. From Jan. 1, 1787, to Jan. 1, 1844, are 13 leap years; we have, therefore, to add the number of minutes in 13 days, $13 \times 24 \times 60 = 18720$ min. To these we add the minutes from 30 minutes past 5 A. M. to midnight = 1050min.

NOTE. We have reckoned but 13 leap years from Jan. 1, 1787, to Jan. 1, 1844, because 1800 was *not* a leap year.

$$\begin{array}{r}
 139680 \\
 1233 \\
 29959200 \\
 266400 \\
 18720 \\
 1050 \\
 \hline
 \end{array}$$

30386283min. Ans.

66.

$$\begin{array}{r}
 \begin{array}{cccc}
 \text{s.} & \text{o} & \text{' } & \text{''} \\
 3 & 14 & 26 & 14 \\
 8 & 19 & 43 & 28 \\
 \hline
 6 & 24 & 42 & 46
 \end{array}
 \end{array}$$

NOTE. As the moon is east of the star, and is also moving eastward in her orbit, we must add 12 signs to the minuend.

67.

$$\begin{array}{r}
 \begin{array}{cccc}
 \text{A.} & \text{R.} & \text{p.} & \text{ft.} \\
 3 & 1 & 23 & 200 \\
 1 & 2 & 37 &
 \end{array}
 \end{array}$$

We first reduce the 200 feet in the minuend to yards and feet, $200 \div 9 = 22\text{yd. } 2\text{ feet.}$

$$\begin{array}{r}
 \begin{array}{cccccc}
 \text{A.} & \text{R.} & \text{p.} & \text{yd.} & \text{ft.} & \text{in.} \\
 3 & 1 & 23 & 22 & 2 & 0 \\
 1 & 2 & 37 & 30 & 8 & 0 \\
 \hline
 1 & 2 & 25 & 21\frac{1}{4} & 3 & 0 \\
 & & & \frac{1}{4} = 2 & 3 & 6 \\
 \hline
 1 & 2 & 25 & 21 & 5 & 36
 \end{array}
 \end{array}$$

68. $\frac{1}{2} + \frac{1}{4} = \frac{1}{2} \times \frac{1}{4} = \frac{1}{4}$ Ans.

69. \$100 - \$40 = \$60; \$60 : \$100 :: \$68.75 : \$114.58 $\frac{1}{4}$ Ans.

70. \$ 134.40 — \$ 120 = \$ 14.40 ; \$ 120 : \$ 14.40 :: \$ 100 : \$ 12 per cent. Ans.

71. \$ 3600 + \$ 4200 + \$ 2200 = \$ 10000 ; \$ 15000 × .15 = \$ 2250 : \$ 15000 — \$ 2250 = \$ 12750 ; \$ 12750 — \$ 10000 = \$ 2750 ; \$ 10000 : \$ 2750 :: \$ 3600 : \$ 990 Emerson's gain ; \$ 10000 : \$ 2750 :: \$ 4200 : \$ 1155 Bailey's gain ; \$ 10000 : \$ 2750 :: \$ 2200 : \$ 605 Curtis's gain.

72. $3\frac{1}{2}$ in. × 2 = 7 in. ; 4 ft. 9 in. = 57 in. ; 3 ft. 7 in. = 43 in. ; 2 ft. 11 in. = 35 in. ; $43 \times 2 = 86$; $43 - 7 = 36$; $35 - 7 = 28$; $86 \times 57 = 4902$; $28 \times 2 = 56$; $56 \times 57 = 3192$; $36 \times 28 \times 2 = 2016$; $4902 + 3192 + 2016 = 10110$; $10110 \div 144 = 70\frac{3}{4}$ square feet ; $57 - 7 = 50$; $43 - 7 = 36$; $35 - 7 = 28$; $50 \times 36 \times 28 = 50400$; $50400 \div 1728 = 29\frac{1}{2}$ cubic feet, Ans.

73. $64 \times 2 = 128$ ft. ; $32 \times 2 = 64$ ft. From 64 ft. we subtract four times the thickness of the wall ; 1 ft. 4 in. × 4 = 5 ft. 4 in. ; 64 ft. — 5 ft. 4 in. = 58 ft. 8 in. ; $128 \text{ ft.} + 58 \text{ ft. 8 in.} = 186 \text{ ft. 8 in.} = \text{length of the wall of the house.}$

| | | | | | | | |
|--------|-----|-----|-----|-------|-----|-----|--|
| ft. | in. | ft. | in. | ft. | in. | 3 | 8 |
| 186 | 8 | 7 | 4 | 2 | 8 | | |
| | 4 | | 3 | 5 | 8 | 6 | 4 |
| 746 | 8 | 22 | 0 | 13 | 4 | 18 | 32 |
| | 7 | 3 | 8 | 1 | 9 | 14 | 2 |
| 3)5226 | 8 | 66 | 0 | 15 | 1 | 72 | 64 |
| 1742 | 2 | 14 | 8 | | 4 | 18 | <small>cubic inches (in a brick.</small> |
| 6963 | 10 | 80 | 8 | 60 | 5 | 252 | |
| 765 | 11 | | | | 4 | | |
| 6202 | 11 | | | 241 | 9 | | |
| 12 | | | | 80 | 8 | | |
| 74435 | | | | 252 | | | |
| 12 | | | | 3)574 | 5 | | |
| 893226 | | | | 191 | 5 | | |
| 12 | | | | 765 | 11 | | |

64)10718720(167,480 bricks, Ans.

74. $\frac{1}{2}$ and $\frac{1}{2} = \frac{1}{12}$ and $\frac{1}{12}$; $\frac{1}{12} + \frac{1}{12} = \frac{1}{6}$; $\frac{1}{6} : \frac{1}{12} ::$
 $\$1000 : \$571.42\frac{1}{2}$ Benjamin's share; $\frac{1}{6} : \frac{1}{12} :: \1000
 $: \$428.57\frac{1}{2}$ Samuel's share.

75. As Bailey occupied the whole house the first three months, he must pay $\frac{1}{3}$ of $\$100 = 33\frac{1}{3}$. As he occupied half of the next 3 months he must pay half of $\$33\frac{1}{3} = \$16\frac{2}{3}$, and Bricket must pay the same sum, $\$16\frac{2}{3}$. For the last 3 months each must pay $\frac{1}{3}$ of $\$33\frac{1}{3} = \$11\frac{1}{3}$. $\$33\frac{1}{3} + \$16\frac{2}{3} + \$11\frac{1}{3} = \$61\frac{1}{3}$ Bailey's share of rent; $\$16\frac{2}{3} + \$11\frac{1}{3} = \$27\frac{2}{3}$ Bricket's share; $\$11\frac{1}{3} = \$11\frac{1}{3}$ Dana's share.

NOTE. In some editions of the Arithmetic wrong names are applied to the answers.

76.

$$\begin{array}{r} 365 \overline{) 576} \quad \overset{a.}{17} \quad \overset{d.}{9} \quad \overset{f.}{(1} \\ \underline{365} \\ 211 \\ \underline{20} \end{array}$$

$$\begin{array}{r} 4 \overline{) 117} \quad \overset{f.}{1} \quad \overset{a.}{11} \quad \overset{d.}{71} \quad \overset{f.}{11} \\ \underline{7} \quad \overset{a.}{10} \quad \overset{d.}{11} \quad \overset{f.}{11} \\ \underline{1} \quad \overset{a.}{19} \quad \overset{d.}{64} \quad \overset{f.}{52} \text{ Ans.} \end{array}$$

$$\begin{array}{r} 365 \overline{) 4237} (11s. \\ \underline{365} \\ 587 \\ \underline{365} \\ 222 \\ \underline{12} \end{array}$$

$$\begin{array}{r} 365 \overline{) 2673} (7\frac{1}{3}d. \\ \underline{2555} \\ 118 \\ \underline{365} \end{array}$$

77. $40 \div 2 = 20$; $20 \times 20 = 400$; $400 \times 2 = 800$;
 $12 \times 12 = 144$; $800 + 144 = 944$; $\sqrt{944} = 30.72 +$
feet, Ans.

78. $\$100 - \$12 = \$88$; $\$88 : \$100 :: \$4.40 :$
 $\$5.00$; $\$100 : \$110 :: \$5.00 : \5.50 Ans.

79. $\$110 : \$100 :: \$5.50 : \5.00 ; $\$100 : \$88 ::$
 $\$5.00 : \4.40 Ans.

80. $\frac{110}{100} - \frac{88}{100} = \frac{22}{100}$; $\frac{88}{100} : \frac{22}{100} :: \$100 : \$25$ per cent. Ans.

81.

| | | |
|----------------------|-------------------------|-----------|
| Emily, Jane, | Abigail, Nancy, | \$ 19,000 |
| Emily, Jane, Betsey, | Abigail, | 19,200 |
| Jane, Betsey, | Abigail, Nancy, | 20,000 |
| Emily, | Betsey, Abigail, Nancy, | 20,500 |
| Emily, Jane, Betsey, | Nancy, | 21,300 |

4) \$ 100,000

Sum of the fortunes \$ 25,000

\$ 25,000 — \$ 19,000 = \$ 6,000 Betsey's fortune.

\$ 25,000 — \$ 19,200 = \$ 5,800 Nancy's fortune.

\$ 25,000 — \$ 20,000 = \$ 5,000 Emily's fortune.

\$ 25,000 — \$ 20,500 = \$ 4,500 Jane's fortune.

\$ 25,000 — \$ 21,300 = \$ 3,700 Abigail's fortune.

NOTE. The two following questions were inserted in the first edition of the Arithmetic (published in 1842), but as they are not *practical*, and their operation too *difficult* for pupils generally, they have been omitted in subsequent editions; yet, as many copies of the first edition are still used in some schools, we have considered it best to insert their operation in the Key.

82. Can the numbers from 1 to 100 be so arranged in a square form, that, if the numbers in either column be added perpendicularly, horizontally, or obliquely, their sum shall be 505?

OPERATION.

| | | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|----|
| 11 | 92 | 12 | 88 | 14 | 15 | 16 | 84 | 83 | 90 |
| 100 | 82 | 26 | 27 | 67 | 35 | 59 | 58 | 50 | 1 |
| 99 | 19 | 75 | 74 | 33 | 66 | 42 | 43 | 51 | 3 |
| 2 | 20 | 76 | 73 | 34 | 36 | 60 | 57 | 49 | 98 |
| 4 | 81 | 25 | 28 | 68 | 65 | 41 | 44 | 52 | 97 |
| 94 | 21 | 77 | 72 | 32 | 37 | 61 | 56 | 48 | 7 |
| 5 | 80 | 24 | 29 | 69 | 64 | 40 | 45 | 53 | 96 |
| 6 | 79 | 23 | 30 | 70 | 38 | 62 | 55 | 47 | 95 |
| 93 | 22 | 78 | 71 | 31 | 63 | 39 | 46 | 54 | 8 |
| 91 | 9 | 89 | 13 | 87 | 86 | 17 | 18 | 10 | |

83. If a loaf of bread be 12 inches broad, and 6 inches high, that is, if it be half a sphere 12 inches in diameter, how thick must be the crust at top and bottom, that it may be half of the substance of the loaf?

Let x represent the thickness of the crust. Then $\sqrt{36 - 12x}$ = semi-base of the loaf; $(6 \times 6 \times 3 + 6 \times 6) 6 \times .5236 = 452.3904$ contents of the large loaf. By dividing the larger loaf by 2 we have the contents of the smaller loaf = 226.1952.

$$((36 - 12x)^3 + (6 - 2x)^2) \times (6 - 2x) .5236 = 226.1952.$$

We divide the equations by .5236 and obtain

$$((36 - 12x)^3 + (6 - 2x)^2) \times (6 - 2x) = 432.$$

By dividing by 2 we have

$$((36 - 12x)^3 + (6 - 2x)^2) \times (3 - x) = 216.$$

By reduction $x^3 - 18x^2 + 81x - 54 = 0$. We first suppose $x = .7$ or $.8$. Substituting these supposed values of x we have

$$(.7)^3 - 18(.7)^2 + 81(.7) - 54 = 0.$$

$$.343 - 8.82 + 56.7 - 54 = -5.777 \text{ first error too small.}$$

$$(.8)^3 - 18(.8)^2 + 81(.8) - 54 = 0.$$

$$.512 - 11.52 + 64.8 - 54 = -.208 \text{ second error too small.}$$

Then $5.5 : .1 :: .2 : .003$ correction to be added to $.8$; $.8 + .003 = .803$. This value of x we find too small, and we suppose $x = .803$ or $.804$.

$$(.803)^3 - 18(.803)^2 + 81(.803) - 54 = 0.$$

$$.517781627 - 11.606562 + 65.043 - 54 = -.04578 \text{ first error too small.}$$

$$(.804)^3 - 18(.804)^2 + 81(.804) - 54 = 0.$$

$$.519718464 - 11.635488 + 65.124 - 54 = +.00823 \text{ second error too large.}$$

.054 : .001 :: .004 : .00007407 correction to be subtracted from .804 ; $.804 - .00007407 = .8039$ near the value of x . This value of x we find too large.

Again, suppose $x = .80387$ or $.80386$.

$$(.80387)^3 - 18 (.80387)^2 + 81 (.80387) - 54 = 0.$$

$$.519466402520603 - 11.6317255842 + 65.11347 - 54 = +.00121 \text{ too large.}$$

$$(.80386)^3 - 18 (.80386)^2 + 81 (.80386) - 54 = 0.$$

$$.519447016552456 - 11.6314361928 + 65.11266 - 54 = +.00067 \text{ too large.}$$

.00054 : .00001 :: .00067 : .00001 to be subtracted from $.80386$; $.80386 - .00001 = .80385 = x$ very near.

NOTE. This answer is true to less than the one hundred thousandth part of an inch. Assuming the above to be the thickness of the crust, we find the contents of the loaf to be 226.19465 cubic inches, whereas the exact contents are 226.1952 cubic inches, making a difference of .00055 of a cubic inch.

BY POSITION.

(See page 228 of the National Arithmetic.)

We first suppose the thickness of the crust to be .8 of an inch. Then the semidiameter of the remaining part of the loaf will be $.6 - .8 = 5.2$; $5.2 \times 5.2 = 27.04$; $.8 \times 8 = .64$; $27.04 - .64 = 26.40$; $\sqrt{26.40} =$ semibase. Then, by Rule 19th, page 161, we find the contents of the loaf to be 227.06647 cubic inches, which are .86127 too large, first error. Again, we suppose the thickness of the crust to be .81 of an inch ; then, proceeding as above, we find the contents of the remaining loaf to be 224.8060221792 cubic inches, which are 1.38917782 inches too small, second error.

$$.8 \times 1.38917782 = 1.111342256$$

$$.81 \times .86127 = .6976287$$

$$2.25044782 \text{) } 1.808970956 \text{ (}.8038 \text{ + Ans.}$$

KEY
TO
THE SUPPLEMENT.

Section 1, (p. 185.)

ADDITION.

| | | | |
|-----|----------|-----|----------|
| 1. | 65605 | 23. | 1000607 |
| 2. | 21616 | 24. | 919984 |
| 3. | 766503 | 25. | 956195 |
| 4. | 13814 | 26. | 1342 |
| 5. | 969754 | 27. | 79115199 |
| 6. | 11720 | 28. | 781461 |
| 7. | 31622 | 29. | 9368 |
| 8. | 949661 | 30. | 17181 |
| 9. | 86578 | 31. | 77159 |
| 10. | 539658 | 32. | 4452369 |
| 11. | 57372 | 33. | 188624 |
| 12. | 848340 | 34. | 8710 |
| 13. | 1000779 | 35. | 188074 |
| 14. | 694764 | 36. | 87799 |
| 15. | 156800 | 37. | 677 |
| 16. | 1802790 | 38. | 1039 |
| 17. | 76833457 | 39. | 227934 |
| 18. | 1111110 | 40. | 63315 |
| 19. | 9323 | 41. | 2373544 |
| 20. | 7693486 | 42. | 931914 |
| 21. | 3155917 | 43. | 1873146 |
| 22. | 2643 | 44. | 8789502 |

Section 2. (p. 187.)

SUBTRACTION.

| | | | |
|-----|--------|-----|---------------|
| 1. | 612 | 16. | 9998392 |
| 2. | 288 | 17. | 6097700810072 |
| 3. | 294 | 18. | 7977100909213 |
| 4. | 281 | 19. | 7100061569937 |
| 5. | 274 | 20. | 500710920089 |
| 6. | 195 | 21. | 1 |
| 7. | 266 | 22. | 455555556 |
| 8. | 54564 | 23. | 8753086431 |
| 9. | 53394 | 24. | 799690466 |
| 10. | 27778 | 25. | 24974975 |
| 11. | 47778 | 26. | 89901 |
| 12. | 3174 | 27. | 90909091 |
| 13. | 471112 | 28. | 999991 |
| 14. | 981012 | 29. | 2967 |
| 15. | 1 | 30. | 99995060 |

Section 3. (p. 188.)

MULTIPLICATION.

| | | | |
|-----|-------------|-----|--------------------|
| 1. | 321300 | 13. | 152288487686 |
| 2. | 186045 | 14. | 5583287990667472 |
| 3. | 518077 | 15. | 49062139937803 |
| 4. | 42435 | 16. | 72103662734481 |
| 5. | 881919 | 17. | 771300535110987 |
| 6. | 184775 | 18. | 1021979711071683 |
| 7. | 9691836 | 19. | 1100289490023168 |
| 8. | 36056465 | 20. | 8888888711111112 |
| 9. | 18219071 | 21. | 490154012100000000 |
| 10. | 24476036 | 22. | 28522743249000 |
| 11. | 70287492 | 23. | 4179911100000 |
| 12. | 77310655940 | 24. | 100000000000 |

| | | | |
|-----|---------------------------------------|-----|-----------------|
| 25. | 1829227995784915872903907060280344576 | 34. | 721361144 |
| 26. | 574290 | 35. | 3798979491 |
| 27. | 3831635 | 36. | 11718335352360 |
| 28. | 1462126 | 37. | 69660900000000 |
| 29. | 264640056 | 38. | 910090908090 |
| 30. | 99070437 | 39. | 24012425012401 |
| 31. | 1877625000 | 40. | 400400800400400 |
| 32. | 826888542 | | |
| 33. | 290355807 | | |

Section 4. (p. 190.)

DIVISION.

| | Quotients. | Remainders. | | Quotients. | Remainders. |
|-----|------------|-------------|-----|------------|-------------|
| 1. | 576 | | 25. | 141093 | 3 |
| 2. | 432 | | 26. | 123456 | 6 |
| 3. | 345 | 3 | 27. | 109739 | 3 |
| 4. | 288 | | 28. | 98765 | 4 |
| 5. | 246 | 6 | 29. | 89786 | 8 |
| 6. | 216 | | 30. | 82304 | 6 |
| 7. | 192 | | 31. | 101986039 | 4 |
| 8. | 172 | 8 | 32. | 97736620 | 21 |
| 9. | 157 | 1 | 33. | 93827156 | 1 |
| 10. | 144 | | 34. | 90218419 | 7 |
| 11. | 41152263 | | 35. | 86876996 | 9 |
| 12. | 30864197 | 1 | 36. | 83774246 | 13 |
| 13. | 24691357 | 4 | 37. | 80885479 | 10 |
| 14. | 20576131 | 3 | 38. | 71081178 | 27 |
| 15. | 17636684 | 1 | 39. | 67019397 | 6 |
| 16. | 15432098 | 5 | 40. | 63396727 | 2 |
| 17. | 13717421 | | 41. | 83821 | 66 |
| 18. | 12345678 | 9 | 42. | 89336 | 31 |
| 19. | 11223344 | 5 | 43. | 115077 | 24 |
| 20. | 10288065 | 9 | 44. | 69995 | 52 |
| 21. | 329218 | | 45. | 78948 | 39 |
| 22. | 246913 | 2 | 46. | 157896 | 39 |
| 23. | 197530 | 4 | 47. | 98399 | 36 |
| 24. | 164609 | | 48. | 100013 | 82 |

| | Quotients. | Remainders. | | Quotients. | Remainders |
|-----|------------|-------------|------|------------|------------|
| 49. | 193505 | 9 | 90. | 15608 | 5 |
| 50. | 234243 | 5 | 91. | 17635 | 6 |
| 51. | 593415 | 14 | 92. | 20267 | 12 |
| 52. | 468466 | 5 | 93. | 23822 | 47 |
| 53. | 97815 | 74 | 94. | 36700 | 1 |
| 54. | 89911 | 50 | 95. | 28889 | 18 |
| 55. | 71884 | 65 | 96. | 50292 | 17 |
| 56. | 183190 | 11 | 97. | 129504 | 53 |
| 57. | 145612 | 33 | 98. | 525731 | 2 |
| 58. | 120827 | 32 | 99. | 587581 | 14 |
| 59. | 111351 | | 100. | 624305 | 11 |
| 60. | 298889 | 10 | 101. | 665926 | 1 |
| 61. | 129065 | 41 | 102. | 344444 | 15 |
| 62. | 25776 | 62 | 103. | 100897 | 88 |
| 63. | 130315 | 8 | 104. | 144927 | 36 |
| 64. | 28958 | 80 | 105. | 243902 | 17 |
| 65. | 33037 | 51 | 106. | 294117 | 21 |
| 66. | 38453 | 45 | 107. | 156249 | 63 |
| 67. | 45993 | 35 | 108. | 185185 | 9 |
| 68. | 57211 | 27 | 109. | 119047 | 51 |
| 69. | 290720 | 25 | 110. | 106382 | 91 |
| 70. | 219813 | 12 | 111. | 3502319 | 714 |
| 71. | 176712 | 33 | 112. | 4071601 | 318 |
| 72. | 147743 | 22 | 113. | 10836330 | 297 |
| 73. | 125171 | 33 | 114. | 4220744 | 231 |
| 74. | 109906 | 53 | 115. | 26080418 | 234 |
| 75. | 91033 | 78 | 116. | 13271009 | 342 |
| 76. | 68549 | 88 | 117. | 9920335 | 599 |
| 77. | 76339 | 58 | 118. | 21474330 | 174 |
| 78. | 86126 | 62 | 119. | 11058232 | 277 |
| 79. | 98792 | 34 | 120. | 8894665 | 211 |
| 80. | 115825 | 40 | 121. | 5762740 | 761 |
| 81. | 139956 | 2 | 122. | 11329128 | 149 |
| 82. | 176786 | 22 | 123. | 8763476 | 209 |
| 83. | 240415 | 5 | 124. | 10015401 | 309 |
| 84. | 157513 | 13 | 125. | 11665193 | 16 |
| 85. | 117125 | 15 | 126. | 5699219 | 72 |
| 86. | 93222 | 12 | 127. | 86268755 | 480 |
| 87. | 77421 | 51 | 128. | 515169749 | 186 |
| 88. | 66201 | 21 | 129. | 8863561583 | 28 |
| 89. | 57821 | 31 | 130. | 8433971 | 6054 |

| | Quotients. | Remainders. | | Quotients. | Remainders. |
|------|--------------|-------------|------|------------|-------------|
| 131. | 1008330074 | 28 | 143. | 39282 | 23776856734 |
| 132. | 62927 | 2295060 | 144. | 85 | 44916000000 |
| 133. | 1099 | 200210510 | 145. | 9876 | 54321123 |
| 134. | 5069 | 40770700 | 146. | 102 | 497654325 |
| 135. | 100096 | 7554 | 147. | 1 | |
| 136. | 99903 | 3955 | 148. | 476 | |
| 137. | 2222220 | 2098764 | 149. | 395 | |
| 138. | 23333335 | 2222222 | 150. | 763 | |
| 139. | 112509971488 | 84412 | 151. | 345 | |
| 140. | 88898800 | 913807 | 152. | 389 | |
| 141. | 3491706185 | 306787 | 153. | 1234 | |
| 142. | 10287295858 | 673434 | 154. | 6538 | 1279 |

Section 5. (p. 192.)

MISCELLANEOUS EXAMPLES.

- | | |
|--------------------|-----------------------|
| 1. 584 dollars. | 12. 37 dollars. |
| 2. 25088 dollars. | 13. 47 dollars. |
| 3. 940 cents. | 14. 1368 hours. |
| 4. 1530 cents. | 15. 5904 ounces. |
| 5. 873 dollars. | 16. 56960 acres. |
| 6. 4257 cents. | 17. 234 dollars. |
| 7. 2106 miles. | 18. 3178 dollars. |
| 8. 61 miles. | 19. 81 dollars. |
| 9. 35405 dollars. | 20. 1488 cents, gain. |
| 10. 42884 dollars. | 21. 576 dollars. |
| 11. 7665 dollars. | 22. 20 dollars. |

Section 6. (p. 194.)

INTEREST.

| 1. | 2. | 3. | 4. |
|---------|----------|-------------|-----------|
| \$144 | \$850 | \$865.75 | \$960.18 |
| .07 | .098 | .229 | .07 |
| \$10.08 | 6800 | 779175 | 6) 672126 |
| | 7650 | 173150 | 112021 |
| | 6) 83300 | 173150 | \$7841.47 |
| | 13883 | 6) 19825675 | |
| | \$97.183 | 3304279 | |
| | | \$23129.954 | |

| 5. | 6. | 7. |
|-------------|-----------|-------------|
| \$1728.19 | \$17.90 | \$1165.50 |
| .2213 | .0403 | .3163 |
| 172819 | 71600 | 699300 |
| 345638 | 1192 | 116550 |
| 345638 | 6) 72792 | 349650 |
| 115212 | .12132 | 58275 |
| 6) 38308211 | \$0.84924 | 6) 36888075 |
| 6384701 | | 6148012 |
| \$44692.912 | | \$43036.087 |

| 8. | 9. | 10. |
|-------------|------------|------------|
| \$1237.90 | \$156.80 | \$579.75 |
| .0953 | .1803 | .0703 |
| 618950 | 1254400 | 4058250 |
| 1114110 | 15680 | 19325 |
| 61895 | 7840 | 6) 4077575 |
| 6) 11821945 | 6) 2830240 | 679595 |
| 1970324 | 471706 | \$4757.170 |
| \$13792.269 | \$3301.946 | |

11.

$$\begin{array}{r}
 \$7671.09 \\
 .160\frac{1}{2} \\
 \hline
 46026540 \\
 767109 \\
 639257 \\
 \hline
 6)123376697 \\
 20562782 \\
 \hline
 \$143939,479.
 \end{array}$$

13.

$$\begin{array}{r}
 \$975.06 \\
 .156\frac{1}{2} \\
 \hline
 585036 \\
 187530 \\
 97506 \\
 48753 \\
 \hline
 152.59689 \\
 8\frac{1}{2} \\
 \hline
 122077512 \\
 3814922 \\
 \hline
 6)125892434 \\
 \$209.82,072
 \end{array}$$

15.

$$\begin{array}{r}
 \$871.75 \\
 .116\frac{1}{2} \\
 \hline
 523050 \\
 87175 \\
 87175 \\
 43587 \\
 \hline
 101.55887 \\
 8\frac{1}{2} \\
 \hline
 81247096 \\
 2538971 \\
 \hline
 6)837.86067 \\
 \$139.64,344
 \end{array}$$

12.

$$\begin{array}{r}
 \$943.11 \\
 .009\frac{1}{2} \\
 \hline
 848799 \\
 78592 \\
 \hline
 6)927391 \\
 154565 \\
 \hline
 \$1081,956
 \end{array}$$

14.

$$\begin{array}{r}
 \$1371.15 \\
 .211\frac{1}{2} \\
 \hline
 137115 \\
 137115 \\
 274230 \\
 91410 \\
 \hline
 290.22675 \\
 11\frac{1}{2} \\
 \hline
 319249425 \\
 7255668 \\
 \hline
 6)3265.05093 \\
 \$544.17,515
 \end{array}$$

16.

$$\begin{array}{r}
 \$976.25 \\
 .186\frac{1}{2} \\
 \hline
 585750 \\
 781000 \\
 97625 \\
 81354 \\
 \hline
 182.39604 \\
 12\frac{1}{2} \\
 \hline
 218875248 \\
 9119802 \\
 \hline
 6)2279.95050 \\
 37999175 \\
 97625 \\
 \hline
 \$135624,175
 \end{array}$$

17.

\$1000
 .199 $\frac{1}{2}$
9000
 9000
 1000
 833
199.833
 5 $\frac{1}{2}$
 999165
 99916
 6)1099.081
183180
 1000
\$1183.18

18.

\$765
 .165
3825
 4590
 765
 6)126.225
\$21.03,7

19.

\$979.15
 .190 $\frac{3}{4}$
8812350
 97915
 65276
186.69126
 2 $\frac{1}{2}$
 37338252
 9334563
 6)466.72815
\$77.78,802

20.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 2 | 9 |
| 1841 | 5 | 7 |
| <hr/> | | |
| 1 | 9 | 2 |

\$760.75
 .105 $\frac{1}{4}$
380375
 76075
 25358
 6)80.13233
1335538
\$93.48,771

21.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 8 | 25 |
| 1841 | 4 | 7 |
| <hr/> | | |
| 2 | 4 | 18 |

\$175.08
 .143
52524
 70032
 17508
 6)25.03644
4.17274
 29.20918
 175.08
\$204.28,918

22.

| y. | mo. | da. |
|-------|-----|-----|
| 1844 | 8 | 9 |
| 1843 | 11 | 11 |
| <hr/> | | |
| 8 | 28 | |

\$160
 .044 $\frac{3}{4}$
640
 640
 106
 6)7.146
1.191
 8.337
 160
168.337

23.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 6 | 4 |
| 1841 | 1 | 26 |
| <hr/> | | |
| 2 | 4 | 8 |

\$ 857.16

.141 $\frac{1}{2}$

85716

342864

85716

28572

121.145287 $\frac{1}{2}$

84801696

3028632

6) 878.30328

\$ 14638.388

24.

| y. | mo. | da. |
|-------|-----|-----|
| 1844 | 6 | 17 |
| 1842 | 2 | 15 |
| <hr/> | | |
| 2 | 4 | 2 |

\$ 171.18

.140 $\frac{1}{2}$

684720

17118

5706

2) 24.02226

12.01113

\$ 36.03339

25.

| y. | mo. | da. |
|-------|-----|-----|
| 1844 | 10 | 9 |
| 1843 | 7 | 17 |
| <hr/> | | |
| 1 | 2 | 22 |

\$ 97.19

.073 $\frac{1}{2}$

29157

68033

6479

6) 7.15966

1.19327

\$ 8.35293

26.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 9 | 11 |
| 1840 | 11 | 19 |
| <hr/> | | |
| 2 | 9 | 22 |

\$ 765.75

.168 $\frac{2}{3}$

612600

459450

76575

51050

129.15650

765.75

\$ 894.9065

27.

| y. | mo. | da. |
|-------|-----|-----|
| 1845 | 11 | 11 |
| 1843 | 2 | 19 |
| <hr/> | | |
| 2 | 8 | 22 |

\$ 850

.163 $\frac{1}{3}$

2550

5100

850

566

139.1169 $\frac{1}{2}$

1252044

69558

6) 1321.602

220.267

850

\$ 1070.267

28.

| y. | mo. | da. |
|-------|-----|-----|
| 1843 | 0 | 19 |
| 1841 | 3 | 2 |
| <hr/> | | |
| 1 | 9 | 17 |

\$ 769.87

.107 $\frac{1}{2}$

538909

76987

64155

6) 83.01764

13.83627

96.85391

769.87

\$ 866.72391

29.

| y. | mo. | da. |
|------|-----|-----|
| 1844 | 6 | 4 |
| 1842 | 5 | 7 |

 2 0 27

\$ 1728.28

.124½

 691312

345656

172828

86414

3) 215.17086

71.72362

 \$ 286.89,448

30.

| y. | mo. | da. |
|------|-----|-----|
| 1845 | 0 | 1 |
| 1843 | 1 | 17 |

 1 10 14

\$ 565.25

.112½

 113050

56525

56525

18841

3) 6349641

21.16547

 84.66188

565.25

 \$ 649.91,188

31.

Principal on interest from Oct. 23, 1840 \$ 960.00

Interest from Oct. 23, 1840, to Sept. 25, 1841,
11 months 2 days

61.97

Amount 1021.97

First payment, Sept. 25, 1841

140.00

New principal carrying interest from Sept.
25, 1841

881.97

Interest from Sept. 25, 1841, to July 7, 1842,
9 months 12 days

48.36

Amount 930.33

Second payment, July 7, 1842

80.00

New principal carrying interest from July
7, 1842

850.33

Interest from July 7, 1842, to Dec. 9, 1842,
5 months 2 days

25.13

Amount 875.46

Third payment, Dec. 9, 1842

70.00

New principal carrying interest from Dec.
9, 1842

805.46

Interest from Dec. 9, 1842, to Nov. 8, 1843,
10 months 29 days

51.52

Amount (carried forward) 856.98

| | |
|--|---------------|
| Amount (brought forward) | \$ 85 6.98 |
| Fourth payment, Nov. 8, 1843 | <u>100 00</u> |
| New principal carrying interest Nov. 8, 1843 | 75 6.98 |
| Interest from Nov. 8, 1843, to Oct. 23, 1844, 11 months 15 days | <u>5 0.78</u> |
| Balance due Oct. 23, 1844 | \$ 807.76 |

32.

| | |
|--|----------------|
| Principal on interest from March 1, 1839 | \$ 1000.00 |
| Interest from March 1, 1839, to March 1, 1840, 12 months | <u>7 0.00</u> |
| Amount | 1070.00 |
| First payment, March 1, 1840 | <u>100 00</u> |
| Principal carrying interest from March 1, 1840 | 970.00 |
| Interest from March 1, 1840, to Sept. 25, 1841, 18 months 24 days | <u>10 6.37</u> |
| Amount | 1076.37 |
| Second payment, Sept. 25, 1841 | <u>200 00</u> |
| Principal carrying interest from Sept. 25, 1841 | 876.37 |
| Interest from Sept. 25, 1841, to Oct. 9, 1842, 12 months 14 days | <u>63.73</u> |
| Amount | 940.10 |
| Third payment, Oct. 9, 1842 | <u>150 00</u> |
| Principal carrying interest from Oct. 9, 1842 | 790.10 |
| Interest from Oct. 9, 1842, to Oct. 9, 1843, 12 months | <u>55.30</u> |
| Amount | 845.40 |
| Fourth payment, July 4, 1843, a sum less than the interest | \$ 20.00 |
| Fifth payment, Oct. 9, 1843, a sum greater than the interest | <u>300 00</u> |
| | 320.00 |
| Principal carrying interest from Oct. 9, 1843 | <u>525.40</u> |
| Interest from Oct. 9, 1843, to Dec. 1, 1844, 13 months 22 days | <u>42.01</u> |
| Balance due Dec. 1, 1844 | \$ 567.41 |

THE END. 











